NONLINEAR TIME SERIES MODELLING OF DAILY MEAN TEMPERATURE IN NIGERIA

BY

OWABUMOYE, OGUNLEYE SUNDAY

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CERTIFICATION

This is to certify that this project was carried out by Mr. Owabumoye Ogunleye Sunday, in the Department of Industrial Mathematics, in partial fulfillment of the requirements for the award of M. Tech. Industrial Mathematics of the Federal University of Technology, Akure, Nigeria.

DR. O. E. OLOWOFESO
SUPERVISOR

28/10/2008
DATE

DR. R. A. ADEMILUYI
Ag. HOD & CHIEF EXAMINER

10/11/08
DATE

PROF. T. O. OBILADE
EXTERNAL EXAMINER

29/10/2008
DATE

DEDICATION

This work is dedicated to God the father, God the Son and Holy Spirit; my anchor, shield and present help in times of need.

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NOMENCALTURE

a, a_i, b, c and d	The parameters of the equations
Δ_j	Determinants
ε_i	Error terms
$\sum$	Summation
∂	Partial differentiation

ABREVIATIONS AND THEIR FULL MEANING

ANPTSM-Nonlinear Parametric Time Series Model

AR- Auto Regressive

ARCH- Autoregressive Conditionally Heteroskedastic

ARMA- Auto Regressive Moving Average

DMT- Daily Mean Temperature

ESTAR- Exponential Smooth Transition Autoregressive

LM- Lagrange Multiplier

LSTR- Logistic Smooth Transition Regression

MARS- Multivariate Adaptive Regression Spline

MNTTTSM-Modified Nonlinear Trigonometric Transformation Time Series Model

OLS- Ordinary Least Square

STAR-Smooth Transition Autoregressive

STR- Smooth Transition Regression

ABSTRACT

This study is based on nonlinear time series modelling in Nigeria. Two models were considered. The first model adopted Gallant parametric model with trigonometric transformation augmented with polynomial of order two, to address the problem of missing values. This is called Augmented Nonlinear Parametric Time Series Model (ANPTSM). In addition, the second model was formulated using Ordinary Least Squares Method, trigonometric transformation and method of calculating an expected value in contingency table of multivariate observations. This is called Modified Nonlinear Trigonometric Transformation Time Series Model (MNTTSM).

The ANPTSM is a nonlinear parametric time series model using trigonometric transformation to solve the problem of missing values in time series, while MNTTSM is a model for the conditional mean of modified nonlinear time series. The consistency and efficiency of the models formulated were determined.

The study examined Nonlinear Trigonometric Transformation as well as Augmented Nonlinear Trigonometric Transformation with polynomial of order two. The two models were practically tested and compared using daily mean of temperature for Ikeja, Ibadan, Ilorin, Minna and Zaria with different rates of missing values. The results were used to determine the consistency and efficiency of the models formulated which showed that MNTTTSM is able to address the problem of missing values and forecast better than the ANPTSM.

CHAPTER ONE

1.0. INTRODUCTION

Time Series Analysis is an important technique used in many disciplines, such as Physics, Engineering, Finance, Economics, Meteorology, Biology, Medicine, Hydrology, Oceanography and Geomorphology. This technique is mainly used to infer properties of a system by the analysis of a measured time record (data). This is done by fitting a representative model to the data with the aim of discovering the underlying structure as closely as possible. Traditional time series analysis is based on assumptions of linearity and stationarity.

However, there has been a growing interest in studying nonlinear and non-stationary time series models in many practical problems because the nature of many phenomena in Physics, Economics, and Finance etc is inherently non-linear. The first and the simplest reason for this is that many real world problems do not satisfy the assumptions of linearity and/or stationarity. For example, the financial markets and trends that are influenced by the climatic factor like daily temperature, amount of rainfall, intensity of sun etc. are the areas where there is a greater need to explain behaviours that are far from being even approximately linear. Therefore, the need for the further development of the theory and applications for nonlinear models is essential.

In general, time series analysis is known for numbers of nonlinear features such as cycles, asymmetries, bursts, jumps, chaos, thresholds, heteroscedasticity and mixtures of these which have to be taken into account. A problem arises directly from a suitable definition of the nonlinear model because not every model is linear. This class clearly encompasses a large number of possible choices.

As we earlier noted that the time series model can be either linear or nonlinear in the parameters to be estimated, so also the nonlinear time series model are further divided into intrinsically linear and intrinsically nonlinear.

Furthermore, forecasting the future values of an observed time series is an important phenomenon for many real world problems. It provides a good basis for production planning and technical decisions. Forecasting means extrapolating the observations available up to a particular time to predict observations at future times. Forecasting methods are mainly classified into qualitative and quantitative techniques, which are based on unscientific and mathematical and/or statistical models respectively. The quantitative techniques are more important than qualitative techniques for future planning. For many real time series data, nonlinear models are more appropriate than linear models for accurately describing the dynamics of the series and making multi-step-ahead forecast (see for example, Tong (1990), Franses and vanDijk (2000)) and Olowofeso (2006)

As many applications in Financial, Physics, Engineering, Economics, Meteorology, Biology, Medicine, Hydrology, Oceanography and Geomorphology etc. data are nonlinear, nonlinear models are appropriate for forecasting and accurately describing returns and volatility. Since there are an enormous number of nonlinear models available for modelling and forecasting economic time series, choosing the best model for a particular application is daunting (Franses and Van Dijk (2000),p.2). Non-linear time series analysis is a rapidly developing area and there have been major developments in model building and forecasting.

In this thesis, chapter one contains the Introduction, chapter two contains the Literature Review while in chapter three is Research Methodology (Models Formulation), in chapter four we have Model Analysis, Results and Discussion; using Practical Data from daily mean Temperature for Ikeja, Ibadan, Ilorin, Minna, and Zaria. In chapter five we have Summary, Conclusion and Recommendation.

The first model is a Gallant 1981 work, which is adopted. This is parametric model with trigonometric transformation augmented with polynomial of order two using monthly sample mean to calculate the parameters which is used to estimate the daily occurrences called Augmented Nonlinear Parametric Time Series Model (ANPTSM) while the second model is a formulated model based on

the Least Square Method and overall monthly and yearly sampled mean in estimating its parameter with the aid of trigonometric transformation (sine only) and the knowledge of calculating the expected value in contingency table of a Chi-square Analysis, called Modified Nonlinear Trigonometric Transformation Time Series Model (MNTTTSM).

The models are formulated based on daily occurrences. The models are formulated along the year and across months believing that we are having $365^{1}/_{4}$ (365.25) days and 12 calendar Months in a year. The models were practically tested and compared using practical data (daily mean of Temperature from 1987 to 1996 for Ikeja, Ibadan, Ilorin, Minna, and Zaria). The models were used to forecast (using the estimated parameters for 1987 to 1994 to forecast for 1995 to 1996 daily mean temperatures) and their results were compared. The graph to show the behaviour of actual and forecasted values for the ANPTSM and MNTTTSM were shown.

1.1 OBJECTIVES OF THE STUDY

The objectives of this research work are to:

i. develop a non linear parametric time series model using trigonometric transformation to solve the problem of missing values in time series.

ii. develop model for the conditional mean of modified nonlinear time series.

iii. determine the consistency and efficiency of the models formulated.

1.2 THE PROPERTIES OF THE MODEL

i. The models treat daily occurrences.

ii. The models treat monthly and yearly occurrences.

iii. The models put missing values into consideration.

iv. In the MNTTTSM the knowledge of estimating the expected values of Chi-Square Analysis is used for better estimation and forecasting.

v. The models can be used in forecasting the future sales and occurrences such that a pre-plan can be made on the forecasted data.

1.3 DEFINITION OF SOME TERMS

Definition 1.1. A time series is a set of sequential observations on X_t, each being

recorded at a specific time t, $t \in (0,\infty)$.

Definition 1.2. A time series is said to be stationary when the mean and variance of the series are constant over time.

Definition 1.3. A time series is said to be non-stationary if the forecasts cannot revert back to a mean level as the mean is not defined and the variance cannot be converged to a stable value.

Definition 1.4. An intrinsically linear model is a nonlinear model that can be expressed, by suitable transformation of the variables in the model, into a standard regression model similar to the equation (1.1) below.

$$Y_i = \beta_0 + \Sigma \beta_j X_{ij} + e_i \quad \text{for } i= 1, 2, 3, \ldots, n., j= 1, 2, 3, \ldots, m \qquad 1.1$$

Definition 1.5. Intrinsically nonlinear is a nonlinear model that such suitable transformation in equation 1.1 does not exist.

Definition 1.6.A trend represents smooth, relatively slowly changing, features of the time series. It can only be represented by continuous function of time. i.e $Y_t = F(t)$. The function must be the one that will be appropriate in particular circumstances, such as polynomials, sine waves or harmonic functions etc.

Definition 1.7. Testing for Linearity: When parametric nonlinear models are used for modeling economic relationships, model specification is a crucial issue. Economic theory is often too vague to allow complete specification of even a linear, let alone a nonlinear model. Usually at least the specification of the lag structure has to be carried out using the available data. As we have discussed earlier, the type of nonlinearity best suited for describing the data may not be cleared at the outset either. The first step of a specification strategy for any type of nonlinear model should therefore consist of testing linearity. As we mentioned above, it may not be difficult at all to fit a nonlinear model to data from a linear process, interpret the results and draw possibly erroneous conclusions. If time series are short that may sometimes be successfully done even in situations in which the nonlinear model is not identified under the linearity hypothesis. There is more statistical theory available for linear models than nonlinear models and the parameter estimation in the former models is generally simpler than in the latter. Finally, multistep forecasting with nonlinear models is more complicated than with linear ones. Therefore the need for a nonlinear model should be considered before any attempt at nonlinear modeling.

CHAPTER TWO

2.0 LITERATURE REVIEW

This chapter is concerned with a review, analysis and the explication of various scholarly works on Nonlinear Time Series Modelling.

2.1 TYPES OF NONLINEAR MODELS

There are different types of nonlinear model. They are discussed below;

2.1.1 MODELS FROM ECONOMIC THEORY

Theory can both be used to suggest possibly sensible nonlinear models or to take into account some optimizing behaviour, with arbitrary assumed cost or utility functions, to produce a model. An example is a relationship of the form

$$y_t = \min(\Phi^{l} w_t, \Phi^{l} w_t) + \varepsilon_t, \qquad 2.1$$

so that y_t is the smaller of a pair of alternative linear combinations of the vector of variables used to model y_t. This model arises from a disequilibrium analysis of some simple markets, with the linear combinations representing supply and demand curves; for more discussion see Quandt (1982) and Madala (1986).

If we replace the "min condition" by another variable z_{t-d} which may also be one of the elements of w_t but not 1, we have

$$y_t = \Phi^{l} w_t + \Phi^{l} w_t F(z_{t-d}) + \varepsilon_t, \qquad 2.2$$

where $F(z_{t-d}) = 0$, $z_{t-d} \leq c$ and $F(z_{t-d})=1$, $z_{t-d} > c$. This is a switching regression model with switching variable z_{t-d} where d is the delay parameter; see Quandt (1982). In univariate time series analysis (2.2) is called a two-regime threshold

autoregressive model; see, e.g. Tong (1990). Model (2.2) may be generalized by assuming a continuum of regimes instead of only two. This can be done for instance by defining

$$F(z_{t-d}) = \{1+ \exp [-\gamma(z_{t-d} - c)]\}^{-1}, \quad \gamma > 0 \qquad 2.3$$

in (2.2). Maddala (1977, p.396) [see also Bacon and Watts (1971)] has already proposed such a generalization which is here called a logistic smooth transition regression (LSTR) model. F may also have the form of a probability density rather than a cumulative distribution function. In the univariate case this would correspond to the exponential smooth transition autoregressive (ESTAR) model (Terasvirta, 1994) or its well-known special case, the exponential autoregressive model (Haggan and Ozaki, 1981). The transition variable may represent changing political or policy regimes, high versus low inflation, upswings versus downswings of the business cycle and so forth. These switching models or their smooth transition counterparts occur frequently in theory which, for example, suggests changes in relationships when there is idle production capacity versus otherwise or when unemployment is low versus high. Aggregation considerations suggest that a smooth transition regression model may often be more sensible than abrupt change in (2.2).

Some theories lead to models that have also been suggested by time series statisticians. An example is the bivariate nonlinear autoregressive model described as a "prey-predator" model by Desai (1984) taking the form

$\Delta Y_{1t} = -a + b \exp(y_{2t})$,

$\Delta Y_{2t} = c + b \exp(y_{1t})$,

where y_1 is the logarithm of the share of wages in national income and y_2 is the logarithm of the employment rate. Other example can be found (Chen and Day, 1992). The fact that some models do arise from theory justifies their consideration but it does not imply that they are necessarily superior to other models that currently do not arise from economic theory.

2.1.2. MODEL FROM TIME SERIES THEORY

The linear autoregressive, moving average and transfer function models have been popular in time series literature following the work by Box and Jenkins (1970) and there are a variety of natural generalizations to nonlinear forms. If the information set being considered is

$I_t=\{Y_{t-j}, j=1,\ldots,q, X_{t-i}, i=0,\ldots,q\}, \qquad q<\infty$

Denote by ε_t the residual from Y_t explained by I_t and let e_{kt} be the residual from X_{kt} explained by I_t (excluding X_{kt} itself). The components of the models considered in this section are nonlinear functions of components such as $g(y_{t-j})$, $h(x_{k,t-j})$, $G(\varepsilon_{t-j})$, $H(e_{k,t-j})$ plus cross – products such as $y_{t-j}\, x_{k,t-i}$, $y_{t-j}\, \varepsilon_{t-i}$, $x_{a,t-j}\, e_{b,t-i}$ or $\varepsilon_{t-j} e_{k,t-i}$. A model would string together several such components, each with parameter. For a given specification, the model is linear in the parameters so they can be easily estimated by OLS. The big questions are about the specification of the model; what components, functions and lags to use. There are so many possible components and combinations that the "curse of

dimensionality" soon become apparent, so that choices of specification have to be made. Several classes of models have been considered. They include

i. Nonlinear autoregressive, involving only functions of the dependent variable. Typically only simple mathematical functions have been considered (such as sine or cosine, sign, modulus, interger powers, logarithm of modulus or ratios of low order polynomials);

ii. Nonlinear transfer function models, using functions of the lagged dependent variable and current and lagged explanatory variables, usually separately;

iii. Bilinear models, $y_t = \Sigma_{j,k}\beta_{jk}y_{t-j}\varepsilon_{t-k}$ + similar terms involving products of a component of x_t and a lagged residual of some kind. This can be thought of as one equation of a multivariate bilinear system, as considered by Stensholt and TjØstheim (1987);

iv. Nonlinear moving averages, being sums of functions lagged residuals ε_t, e_t ;

v. Doubly stochastic models which contain the cross-products between lagged y_t and current and lagged components of x_{kt} or a random parameter process and are discussed in TjØstheim (1986);

Most of the models are augemented by a linear autoregressive term. There has been little consideration of mixtures of these models. Because of difficulty of analysis, lags are often taken to be small.

2.1.3 FLEXIBLE STATISTICAL PARAMETRIC MODELS

A number of important modeling procedures concentrate on models of the form; $y_t = \beta^{l} w_t + \Sigma\, \alpha_j\, \Phi_j(\gamma_j^{l}\, w_t) + \varepsilon_t$, (2.4)

where w_t is a vector of past y_t values and present values of a vector of explanatory variables X_t plus a constant. The first component of the model is linear and the $\Phi_j(x)$ are set of specific functions in x, examples being:

i. power series, $\Phi_j(x) = x^j$ (x is generally not a lag of y);

ii. trigonometry, $\Phi(x)$ = sin x or cos x, (2.4) augmented by a quadratic term $W_t^{l}\, AW_t$ gives the flexible function forms discussed by Gallant (1981);

iii. $\Phi_j(x) = \Phi(x)$ for all j, where $\Phi(x)$ is a "squashing function" such as a probability density function of logistic function $\Phi(x) = [1+\exp(-x]^{-1}$. This is a neutral network model, which had been used successfully in various fields, especially as a learning model, see, e.g. White (1989) or Kuan and White (1994);

iv. If $\Phi_j(x)$ is estimated non-parametrically, by a "super-smoother", say, the method is that of "projection-pursuit".

The first three models are dense in the sense that the theorems exist suggesting that any well-behaved function can be approximated arbitrarily well by a high enough choice of p, the number of terms in the sum, for example

Stinchcombe and White (1989). In practice, the sample sizes available in economics limit p to a small number, say one or two, to keep the number of parameters to be estimated at a reasonable level. In theory p should be chosen using some criterion or good-of-fit measure. In practice, a small, arbitrary value is usually chosen, or some simple experimentation is undertaken. These models are sufficiently structured to provide interesting and probably useful classes of nonlinear relationships in practice. They are natural alternatives to non-parametric and semi-parametric models. A non-parametric model produces an estimate of a function at every point in the space of explanatory variables by using some smoother, but not a specific parametric function. The distinction between parametric and non-parametric estimators is not sharp, as methods using splines or neutral nets with an undetermined cut-off value indicate.

2.1.4 STATE-DEPENDENT, TIME-VARYING PARAMETER AND LONG-MEMORY MODELS

Priestley (1988) has discussed a very general class of models for a system taking the form $Y_t = \Sigma\Phi_j(x_{t-1})\, Y_{t-j} + \mu\,(x_{t-1}) + \varepsilon_t$

(Moving average terms can also be included) where Y_t is a k x 1 stochastic Vector and x_t is a "state-variable" consisting of $x_t = (Y_t, Y_{t-1}, \ldots, Y_{t-k+1})$ and which is updated by Markov system {see A. Arnes, F. Valeur G. Vigna and R. A. Kemmerer (2006)}.

$X_{t+1} = h\,(x_t) + F(x_t)\, x_t + V_{t+1}$

Here the Φ's and the components of the matrix F are general functions, which in practice will be approximated by linear or low-order polynomials. Many of the models discussed later in section 2.2 can be embedded in this form. It is clearly related to the extended Kalman filter [see Anderson and Moore (1979)] and to time-varying parametric Auto Regressive Moving Average (ARMA) models, where the parameters evolve according to some simple Auto Regressive Model (AR); see Granger and Newbold (1986, Chapter 10). For practical use various approximations can be applied, but so far there is little actual use of these models with multivariate economic series.

For most of the models considered later in section 2.2., the series are assumed to be stationary, but this is not always a reasonable assumption in economics. In linear context many actual series are I(1), in that they need to be differenced in order to become stationary, and some pairs of variables are co-integrated, in that they are both I(1) but there exists a linear combination that is stationary. A start to generalizing these concepts to nonlinear cases has been made by Granger and Hallman (1991a, b). I(1) is replaced by a long-memory concept and co-integration by a possible nonlinear attractor, so that y_t, x_t are each long-memory but there is a function g(x) such that $y_t - g(x)$ is stationary.

2.1.5 Nonparametric Models

Nonparametric modeling of time series does not require an explicit model but for reference purposes it is assumed that there is the following model

$$y_t = f(y_{t-1}, x_{t-1}) + g(y_{t-1}, x_{t-1})\,\varepsilon_t \qquad (2.5)$$

where {yt, xt } are observed being exogenous, and where

$y_{t-1} = (y_{t-i1}, \ldots, y_{t-i\,p})$ and $x_{t-1} = (x_{t-j1}, \ldots, x_{t-j\,q})$ are vectors of lagged variables, and $\{\varepsilon_t\}$ is a sequence of martingale differences with respect to the information set $I_t = \{y_{t-i}, i>0; x_{t-i}, i>0\}$. The joint process {yt, xt} is assumed to be stationary and strongly mixing [cf. Robinson (1983)]. The model formulation can be generalized to several variables and the instantaneous transformation of exogeneous variables. There has recently been a surge of interest in nonparametric modeling; for references see, for instance, Ulla (1989), Bernett et al. (1991) and Hardle (1990). The motivation is to approach the data with as much flexibility as possible, not being restricted by the straitjacket of a particular class of parametric models. However, more observations are needed to obtain estimates of comparable variability. In econometric applications the two primary quantities of interest are the conditional mean

$$M(y\,;x) = M(y_1,\ldots, y_p; x_1,\ldots,x_q)$$

$$= E(y_t \backslash Y_{t-i1} = y_1,\ldots, y_{t-i\,p} = y_p; x_{t-j1} = x_1,\ldots,x_{t-jq} = x_q) \qquad (2.6)$$

and the conditional variance

$$V(y\,;x) = V(y_1,\ldots, y_p; x_1,\ldots,x_q)$$

$$= Var(y_t \backslash Y_{t-i1} = y_1,\ldots, y_{t-i\,p} = y_p; x_{t-j1} = x_1,\ldots,x_{t-jq} = x_q) \qquad (2.7)$$

The conditional mean gives the optimal least square predictor of y_t given lagged values $Y_{t-i1},\ldots, y_{t-i\,p}; x_{t-j1},\ldots,x_{t-jq}$. Derivates of $M(\mathbf{y}\,;\mathbf{x})$ can also have

economic interpretations (Ullah, 1989) and can be estimated nonparametrically. The conditional Variance can be used to study volatility. For (2.5),

$M(\mathbf{y} ; \mathbf{x}) = f(\mathbf{y} ; \mathbf{x})$ and $V(\mathbf{y} ; \mathbf{x}) = \sigma^2 g^2(\mathbf{y} ; \mathbf{x})$, where $\sigma^2 = E(\varepsilon_t^2)$.

As pointed out in the introduction, this survey mainly concentrates on $M(\mathbf{y} ; \mathbf{x})$ while it is assumed that $g(\mathbf{y} ; \mathbf{x}) \equiv 1$

A problem of nonparametric modeling in several dimensions is the curse of dimensionality. As the number of lags and regressors increases, the number of observations in a unit volume element of regressor space can become very small, and it is difficult to obtain meaningful nonparametric estimates of (2.6) and (2.7). Special Methods have been designed to overcome this obstacle. Applying this methods often result in a model which is an end product in that no further parametric modeling is necessary.

Another remedy to dimension difficulties is to apply semi parametric models. These models usually assume linear and parametric dependence in some variables, and nonparametric functional dependence in the rest.

2.2 SPECIFICATION OF NONLINEAR MODELS

If linearity tests indicate the need for a nonlinear model and economic theory does not suggest a completely specified model, then the structure of the model has to be specified from the data. This problem also exists in nonparametric modeling as a variable selection problem because the lags needed to describe the

dynamics of the process are usually unknown; see Auestad and TjØstheim (1991) and TjØstheim and Auestad (1994a,b). To specify univariate time series models, Haggan et al. (1984) devised a specification technique based on recursive estimation of parameters of a linear autoregressive model. The parameters of the model were assumed to change over time in a certain fashion. Choosing a model from a class of state-dependent models, (see Priestey (1988)), was carried out by examining the graphs of recursive estimates. Perhaps because the family of state-dependent models is large and, thus, the possibilities are many, the technique is not easy to apply.

If the class of parametric models to choose from is more restricted, more concrete specification methods may be developed. [For instance, Box and Jenkins (1970) restricted their attention to linear ARMA models.] Tsay (1989) presented a technique making use of linearity tests and visual inspection of some graphs to specify a model from the class of threshold autoregressive models. It is easy to use and seems to work well. Chen and Tsay (1993a) considered the specification of functional-coefficient autoregressive models whereas Chen and Tsay (1993b) extended the discussion to additive functional-coefficient regression models. The key element in that procedure is the use of arranged local regressions in which the observations are ordered according to a transition variable. Lewis and Steven (1991a) applied multivariate adaptive regression spline (MARS), see Friedman (1991), to specify adaptive spline threshold autoregressive models. Terasvirta (1994) discussed the specification of smooth transition autoregressive models.

This technique was generalized to smooth transition regression models in Granger and Terasvirta (1993, Chapter 7).

2.3 ESTIMATION IN NONLINEAR TIME SERIES

2.3.1 Estimation of Parameters in Parametric Models

For parametric nonlinear models, conditional nonlinear least square is the most common estimation technique. If errors are normal and independent, this is equivalent to conditional maximum likelihood. The theory derived for dynamic nonlinear model $y_t = \Phi' w_t + f(\Phi, w_t, v_t) + u_t$ with $g \equiv 1$ gives the conditions for consistency and asymptotic normality of the estimators. For an account, see, e.g. Gallant (1987, Chapter 7). Even more general conditions were recently laid out in Potscher and Prucha (1991a,b). These conditions may be difficult to verify in practice, so that the asymptotic standard deviation estimates, confidence intervals and the like have to be interpreted with care. For discussions of estimation algorithms, see, e.g. Quandt (1983), Judge et al. (1985, Appendix B) and Bates and Watts (1988). The estimation of parameters in (2.2) may not always be straightforward. Local minima may occur, so that estimation with different starting-values is recommended. Estimation of γ in transition function (2.3) may not be sufficiently many observations in the neibourhood of the point about which the transition takes place. The convergence of the estimate sequence may therefore be slow and the standard deviation estimate of γ most often very large. This

problem is discussed, e.g. in Bates and Watts (1988, p. 87), Granger and Terasvirta (1993, Chapter 7), Seber and Wild (1989, pp. 480-481) and Terasvirta (1994). For simulation evidence and estimation using real economic data sets, see also Chan and Tong (1986), Granger et al. (1993), Luukkonen (1990) and Terasvirta and Anderson (1992). Model (2.2) may even be a switching regression model in which case γ is not finite and, in principle, cannot be estimated. In that case convergence may still occur at some very large value, but obtaining a negative definite Hessian probably turns out to be a problem. An available alternative then is to fix γ at some sufficiently large but finite value and estimate the remaining parameters conditionally on that value.

The estimation parameters become more complicated if the model contains lagged errors as the bilinear model does. Subba Tao and Gabr (1984) outlined a procedure for the estimation of a bilinear model based on maximizing the conditional likelihood. Quick preliminary estimates may be obtained using a long autoregression to estimate the residuals and OLS for estimating the parameters keeping the residuals fixed. This is possible because the bilinear model has a simple structure in the sense that it is linear in the parameters if we regard the lagged residual as observed. Granger and Terasvirta (1993, Chapter 7) suggested this alternative.

If the model is a switching regression or threshold autoregressive model, nonlinear least squares is an inapplicable technique because of the irregularity of the sum of squares or the likelihood function. The problem consists of the

unknown switch-points or thresholds for which unique point estimates are not available as long as the number of observations is finite. Tsay (1989) suggested specifying (approximate) switch-points from "scatterplots of t values" in ordered (according to the switching variable) recursive regressions. As long as the recursion stays in the same regime, the t-value of a coefficient estimate converges to a fixed value. When observations from another regime are added into the regression, the coefficient estimates start changing and t-values deviating . Tsay (1989) contains examples. The estimation of parameters in regimes is carried out by ordinary least squares. Chan (1993) showed (in the univariate case) that if the model is stationary and ergodic, the parameter estimates, including those of the thresholds, are strongly consistent; for a discussion see Tong (1990, Section 5.5.3).

2.3.2 Estimation of nonparametric Function

In nonparametric estimation the most common way of estimating the conditional mean (2.6) and variance (2.7) is to apply the so-called kernel method. It is based on a kernel function k(x) which, typically, is a real continuous, bounded, symmetric function integrating to one. Usually it is required that $k(x) \geq o$ for all x, but sometimes it is advantageous to allow k(x) to take negative values, so that we may have $\int x^2 k(x)dx = 0$. The kernel acts as a smoothing device in the estimation procedure. For quantities depending on several variables as in (2.6) and (2.7) a product kernel can be used.

2.3.3 Estimation in Restricted Nonparametric and Semi-parametric Models

As mentioned above, general nonparametric estimation with many variables leads to increased variability and problems with the curse of dimensionality. To alleviate these problems one can look at more restrictive models requiring particular forms for f and g in (2.5) or one can consider semi-parametric model.

i. Additive Models: Virtually all restricted models have some sort of additivity built into them. In the simplest case (using consecutive lags)

$$y_t = \sum_{i=1}^{p} \alpha_i(y_{t-i}) + \sum_{i=1}^{q} \beta_i(x_{t-i}) + \varepsilon_t$$

Regression version of such models and generalization with iteration terms are analysed extensively in Hastie and Tibshirani (1990) and references therein.

ii. Projection Pursuit Type Models: These models can be written as

$$y_t = \sum_{j=1}^{r} \beta_j(\gamma_j \cdot y_{t-1} + \varphi_j \cdot x_{t-1}) + e_t,$$

where β_j, j = 1,...,r, are unknown functions, γ_j and φ_j are unknown vectors determining the direction of the jth projector, and y_{t-1}, x_{t-1} are as in (2.5). An iterative procedure (Friedman and Stuetzle, 1981) exists for deriving optimal projectors (projection pursuit step) and function β_j. The curse of dimensionality is avoided since the smoothing part of the algorithm exploits the fact that β_j is a function of one scalar variable. For time series data, experience with this method is limited. A small simulation study that Granger and Terasvirta (1992) conducted

gave marginal improvements compared to linear model fitting for the particular nonlinear models they considered.

iii. Regression Trees, Spline and MARS: Assume a model of form

$Y_t = f(y_{t-1}, x_t) + e_t$

and approximate $f(y,x)$ in terms of simple basis functions $B_j(y,x)$ so that $f_{appr}(y,x) = \Sigma_j c_j B_j(y,x)$. In the regression tree approach (Breiman et al., 1984) f_{appr} is built up recursively from indicator function $B_j(y,x) = I\{(y,x) \in R_j\}$ and the region R_j are partitioned in the next step of the algorithm according to a certain pattern. As can be expected, there are problems in fitting simple smooth functions like the linear model.

Friedman (1991) in his MARS (multivariate adaptive regression spline) methodology has made at least two important new contributions. First, to overcome the difficulty in fitting simple smooth functions and the second contribution is to replace step functions by products of linear left and right truncated regression splines.

iv. Stepwise Series Expansion of Conditional Densities: In a sense the conditional density $p(y_t | y_{t-1}, x_{t-1})$ is the most natural quantity to look at in a joint modeling of $\{y_t, x_t\}$ since predictive distributions as well as the conditional mean and variance can all be derived from the quantity. Gallant and Tauchen (1989) used this fact as their starting-point.

The conditional density is estimated, to avoid the curse of dimensionality, by expanding it in Hermite polynomials. These are centred and scaled so that the

conditional mean M(y,x) and variance V(y,x) play a prominent role. As first approximation they are supposed to be linear Gaussian and of ARCH type respectively.

v. Semi-parametric Models: Another way of trying to eliminate the difficulties in evaluating high-dimensional conditional quantities is to assume nonlinear and nonparametric dependence in some of the predictors, and parametric and usually linear dependence in others. An illustrative example is given by Engle et al. (1986) who modeled electricity sales using a number of predator variables. It is natural to assume the impact of temperature on electricity consumption to be nonlinear, as both high and low temperatures lead to increased consumption, whereas a linear relationship may be assumed for other regressors. A similar situation arose in Shunway et al. (1988) which is a study of mortality as a function of weather and pollution variables in the Los Angeles region.

In the context of model (2.5) with linear dependence on lags of y_t and nonlinearity with respect to the exogenous variable $\{x_t\}$, we have

$$y_t = a' y_{t-1} + f(x_{t-1}) + \varepsilon_t.$$

The modeling technique would depend somewhat on the dimension of x_{t-1}. In the case where the argument of f is scalar, it can be incorporated in the backfitting algorithm of Hastie and Tibshirani (1990,p. 118). Under quite general assumptions it is possible to obtain $\sqrt{T}$ - consistency for the parametric part as demonstrated by Hechman (1986) and Robinson (1988). Powell et al. (1989) developed the theory further and gave econometric applications.

2.4 EVALUATION OF ESTIMATED MODELS

After estimating a nonlinear time series model it is necessary to evaluate its properties to see if the specified and estimated model may be regarded as an adequate description of the relationship it was constructed to characterize. The residuals of the model can be subjected to various tests such as those against error autocorrelation, ARCH and normality. At least in the parametric case linearity of the time series was tested and similar tests may now be performed on the residuals to see if the model adequately characterizes the nonlinearity the tests previously suggested. For instance, Eitrheim and Terasvirta (1993) proposed testing the STAR model against an alternative containing to additive STAR components and derived Lagrange multiplier (LM) type test for this purpose. The test applies to STR models as well. As to testing the null of no error autocorrelation it should be noted that the asymptotic distribution of the Ljung-Box test statistic based on estimated residuals is not available, as the correct number of degrees of freedom is known only if the estimated model is a linear ARMA model. For this reason, Eitrheim and Trasvirta (1993) also derived an LM test for testing the residuals of the STR model against autocorrelation.

One should also study the long-term properties of the model, which generally can only be done numerically by simulating the model without noise. A bilinear model constitutes an exception as its long-term solution is the same as that of the corresponding linear autoregressive model. The exogenous variable should be set on a constant level, for instance, to equal their sample means. If the solution

path diverges, the model should be rejected and re-specification attempted. Other examples of a solution are a limit cycle or unique stable singular point. Sometimes several solutions may appear depending on the starting – values. See e.g. Ozaki (1985) for further discussion.

The-out-of-sample prediction of the model is an important part of the evaluation process. The precision of the forecasts should be compared to those from the corresponding linear model. However, the results also depend on the data during the forecasting period. If there are no observations in the range in which nonlinearity of the model makes an impact, then the forecasts cannot be expected to be more accurate than those from a linear model. The check is thus negative: if the forecasts from the nonlinear model are significantly less accurate than those from the corresponding linear one, then the nonlinear specification should be reconsidered.

A further check of the estimated model is to see whether it can reproduce a feature of interest in the data. A fitted model is considered adequately only if it is capable of doing that. The spectral density function of the time series may be such a feature. The check is carried out by bootstrapping the estimated model (linear or nonlinear) which required to be parametric. Details and examples can be found in Tsay (1992).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This section discussed the method used in this work. It comprises; data collection, derivation of the governing equation and models formulation from the governing equation derived. Two models are to be formulated;

The first Model will be formulated using the monthly mean for each year to estimate the daily occurrences (trigonometric i.e sine and cosine transformation augmented with Polynomial of order two is applied to formulate the Model) while the second Model will be formulated using the overall monthly and yearly mean for sampled data (trigonometric i.e sine transformation and method of calculating an expected values in contingency table of multivariate were used).

3.1 DATA COLLECTION

Data used in this work were daily mean of temperature from 1987 to 1996 for Ikeja, Ibadan, Ilorin, Minna, and Zaria. The data were collected from Meteorological Centre- Oshodi Lagos.

3.2 MODEL FORMULATION

Generally for this model, the data should be of the form;

t/i	1	2	3	4	5	6	7	8	9	10	11	12	$\Sigma x_i/12$
1	$x_{1,1,k}$	$x_{1,2,k}$	$x_{1,3,k}$	$x_{1,4,k}$	$x_{1,5,k}$	$x_{1,6,k}$	$x_{1,7,k}$	$x_{1,8,k}$	$x_{1,9,k}$	$x_{1,10,k}$	$x_{1,11,k}$	$x_{1,12,k}$	$\overline{X}_1$
2	$x_{2,1,k}$	$x_{2,2,k}$	$x_{2,3,k}$	$x_{2,4,k}$	$x_{2,5,k}$	$x_{2,6,k}$	$x_{2,7,k}$	$x_{2,8,k}$	$x_{2,9,k}$	$x_{2,10,k}$	$x_{2,11,k}$	$x_{2,12,k}$	$\overline{X}_2$
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
t	$x_{t,1,k}$	$x_{t,2,k}$	$x_{t,3,k}$	$x_{t,4,k}$	$x_{t,5,k}$	$x_{t,6,k}$	$x_{t,7,k}$	$x_{t,8,k}$	$x_{t,9,k}$	$x_{t,10,k}$	$x_{t,11,k}$	$x_{t,12,k}$	$\overline{X}_t$
	$X^{\bullet}_{1,k}$	$X^{\bullet}_{2,k}$	$X^{\bullet}_{3,k}$	$X^{\bullet}_{4,k}$	$X^{\bullet}_{5,k}$	$X^{\bullet}_{6,k}$	$X^{\bullet}_{7,k}$	$X^{\bullet}_{8,k}$	$X^{\bullet}_{9,k}$	$X^{\bullet}_{10,k}$	$X^{\bullet}_{11,k}$	$X^{\bullet}_{12,k}$	$\Sigma X^{\bullet}_{ik}/12$

for a particular year. In this Model many years will be considered and the model will be formulated base on the data described below;

t/i_k	1	2	3	.	.	.	i_k	$\Sigma x_{i/ik}$
1	$X_{1,1,1}$	$X_{1,2,1}$	$X_{1,3,1}$	.	.	.	$X_{1,i,k}$	$\overline{X}_{1,k}$
2	$X_{2,1,1}$	$X_{2,2,1}$	$X_{2,3,1}$	.	.	.	$X_{2,i,k}$	$\overline{X}_{2,k}$
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
t	$X_{t,1,1}$	$X_{t,2,1}$	$X_{t,3,1}$	.	.	.	$X_{t,i,k}$	$\overline{X}_{t,k}$
	$X^*_{1,k}$	$X^*_{2,k}$	$X^*_{3,k}$	.	.	.	$X^*_{i,k}$	$\Sigma X^*_{i,k}/ik = X.$

3.2.1 ASSUMPTION AND NOTATION FOR THE MODELS:

Let;

$X_{t,i,k}$: denotes the value of occurrence for day t of Month i in the year k.

$\overline{X}_{t,k}$:denote the mean occurrence for day t of year k.

$X^*_{i,k}$: denotes mean occurrence for month i of year k.

X^{*y}_K : denotes overall yearly mean for the sampled Month.

X^{*m}_i : denotes overall monthly mean for the sampled year.

t: denotes the position of the day from the first day of the Month to the last day of the month. $1 \leq t \leq 31$

t_i: denotes the sum of days in month i for $28 \leq t_i \leq 31$

t_{ik}: denotes the position of the day from the initial sampled day, Month and year to a particular day of month i of year k. $0 < t_{iK} < \infty$

t_i^* : denotes the position of the days from the first day (i.e.1st of January) to the last day of the year (i.e. 31st of December). $1 \leq t_i^* \leq 365^1/_4$

k: denotes the position of a particular year from an initial sample year for $0<k<\infty$

n : denotes the number of sampled years.

m: denotes the number of sampled months.

$\dot{X}_.$= Grand Mean occurrence for k year(s) examined.

In this work, the first model (ANPTSM) is reviewed based on the assumption that the sum of the occurrences are to be presented monthly, where i^{th} Month represents the Month i for $1 \leq i \leq 12$ which is to be modeled using the number of days in each month i.e

	Jan.	Feb.	Mar.	April.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan	...	
i =	1	2	3	4	5	6	7	8	9	10	11	12	13	...	i_k
t =	31	$28^1/_4$	31	30	31	30	31	31	30	31	30	31	31	...	t_i
t_i =	31	$59^1/_4$	$90^1/_4$	$120^1/_4$	$151^1/_4$	$181^1/_4$	$212^1/_4$	$243^1/_4$	$273^1/_4$	$304^1/_4$	$334^1/_4$	$365^1/_4$	$396^1/_4$	...	t_{ik}

3.2.2 AUGMENTED NONLINEAR PARAMETRIC TIME SERIES MODEL (ANPTSM)

Basically, on the project, trigonometric (Sine & Cosine) transformation augmented with Polynomial of order two are applied to formulate the model across the year i.e Monthly mean sample and the Least Square Method are used for estimating its Parameters as described below;

Let the equation be of the form;

$$X_{t,i,k} = a_1 + a_2\, t\mathrm{Sin}(t_{ik}) + a_3\, t^2\mathrm{Cos}(t_{ik}) + \varepsilon_{ik} \qquad 0< ik <\infty \quad \ldots\ldots\ldots\ldots\ldots 3.0$$

The expected value of $X_{t,i,k}$ is $X^*_{i,k}$ then the equation can be reformed as below to estimate the parameters; a_1, a_2 and a_3 using Least Square Method.

$$X^*_{i,k} = a_1 + a_2\, t_i\mathrm{Sin}(t_{ik}) + a_3\, t_i^{\,2}\mathrm{Cos}(t_{ik}) + \varepsilon_{ik} \qquad 0<ik <\infty \quad \ldots\ldots\ldots\ldots\ldots 3.1$$

$$\therefore \quad \varepsilon_{ik} = X^*_{i,k} - (a_1 + a_2\, t_i\, \mathrm{Sin}(t_{ik}) + a_3\, t_i^2\, \mathrm{Cos}(t_{ik})) \ldots\ldots\ldots\ldots\ldots 3.2$$

Let $\Sigma\varepsilon_{ik}^2 = S = \Sigma(X^*_{i,k} - (a_1 + a_2 t_i \mathrm{Sin}(t_{ik}) + a_3 t_i^2 \mathrm{Cos}(t_{ik})))^2$ 3.3

Equation 3.3 is the sum of squares of the residual. To minimize the error term, we used calculus approach to get the set of normal equation below

$\partial S/\partial a_1 = -2\Sigma (X^*_{i,k} - (a_1 + a_2 t_i \mathrm{Sin}(t_{ik}) + a_3 t_i^2 \mathrm{Cos}(t_{ik})))$

as $\frac{\partial S}{\partial a_1} \to 0$

$\Sigma X^*_{i,k} = ma_1 + a_2 \Sigma t_i \mathrm{Sin}(t_{ik}) + a_3 \Sigma t_i^2 \mathrm{Cos}(t_{ik})$.....3.4

where m is the number of the monthly sample mean examined.

Similarly;

as $\frac{\partial S}{\partial a_2} \to 0$

$\Sigma t_i \mathrm{Sin}(t_{ik}) X^*_{i,k} = a_1 \Sigma t_i \mathrm{Sin}(t_{ik}) + a_2 \Sigma t_i^2 \mathrm{Sin}^2(t_{ik}) + a_3 \Sigma t_i^3 \mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik})$.....3.5

as $\frac{\partial S}{\partial a_3} \to 0$

$\Sigma t_i^2 \mathrm{Cos}(t_{ik}) X^*_{i,k} = a_1 \Sigma t_i^2 \mathrm{Cos}(t_{ik}) + a_2 \Sigma t_i^3 \mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}) + a_3 \Sigma t_i^4 \mathrm{Cos}^2(t_{ik})$.....3.6

$$\Delta_0 = \begin{vmatrix} m & \Sigma t_i \mathrm{Sin}(t_{ik}) & \Sigma t_i^2 \mathrm{Cos}(t_{ik}) \\ \Sigma t_i \mathrm{Sin}(t_{ik}) & \Sigma t_i^2 \mathrm{Sin}^2(t_{ik}) & \Sigma t_i^3 \mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}) \\ \Sigma t_i^2 \mathrm{Cos}(t_{ik}) & \Sigma t_i^3 \mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}) & \Sigma t_i^4 \mathrm{Cos}^2(t_{ik}) \end{vmatrix}$$

$= m\{\Sigma t_i^2 \mathrm{Sin}^2(t_{ik}) \Sigma t_i^4 \mathrm{Cos}^2(t_{ik}) - (\Sigma t_i^3 \mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}))^2\}$

$- \Sigma t_i \mathrm{Sin}(t_{ik}) \{\Sigma t_i \mathrm{Sin}(t_{ik}) \Sigma t_i^4 \mathrm{Cos}^2(t_{ik}) - \Sigma t_i^2 \mathrm{Cos}(t_{ik}) \Sigma t_i^3 \mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik})\}$

$+ \Sigma t_i^2 \mathrm{Cos}(t_{ik}) \{\Sigma t_i \mathrm{Sin}(t_{ik}) \Sigma t^3 \mathrm{Sin}(t_i)\mathrm{Cos}(t_{ik}) - \Sigma t_i^2 \mathrm{Cos}(t_i) \Sigma t_i^2 \mathrm{Sin}^2(t_{ik})\}$.....3.7

$$\Delta_1 = \begin{vmatrix} \Sigma X^*_{i,k} & \Sigma t_i \mathrm{Sin}(t_{ik}) & \Sigma t_i^2 \mathrm{Cos}(t_{ik}) \\ \Sigma t_i \mathrm{Sin}(t_{ik}) X^*_{i,k} & \Sigma t_i^2 \mathrm{Sin}^2(t_{ik}) & \Sigma t_i^3 \mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}) \\ \Sigma t_i^2 \mathrm{Cos}(t_{ik}) X^*_{i,k} & \Sigma t_i^3 \mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}) & \Sigma t_i^4 \mathrm{Cos}^2(t_{ik}) \end{vmatrix}$$

$$=\Sigma X^{*}_{i,k}\{\Sigma t_i^2\mathrm{Sin}^2(t_{ik})\Sigma t_i^4\mathrm{Cos}^2(t_{ik})-(\Sigma t_i^3\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}))^2\}$$

$$-\Sigma t_i\mathrm{Sin}(t_{ik})\{\Sigma t_i\mathrm{Sin}(t_{ik})\,X^{*}_{i,k}\,\Sigma t^4\mathrm{Cos}^2(t_{ik})-\Sigma t_i^2\mathrm{Cos}(t_{ik})\,X^{*}_{i,k}\,\Sigma t_i^3\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik})\}$$

$$+\Sigma t_i^2\mathrm{Cos}(t_{ik})\{\Sigma t_i\mathrm{Sin}(t_{ik})\,X^{*}_{i,k}\,\Sigma t_i^3\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik})-\Sigma t_i^2\mathrm{Cos}(t_{ik})\,X^{*}_{i,k}\,\Sigma t_i^2\mathrm{Sin}^2(t_{ik})\} \quad \ldots 3.8$$

$$\Delta_2 = \begin{vmatrix} m & \Sigma X^{*}_{i,k} & \Sigma t_i^2\mathrm{Cos}(t_{ik}) \\ \Sigma t_i\mathrm{Sin}(t_{ik}) & \Sigma t_i\mathrm{Sin}(t_{ik})\,X^{*}_{i,k} & \Sigma t_i^3\,\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}) \\ \Sigma t_i^2\mathrm{Cos}(t_{ik}) & \Sigma t_i^2\mathrm{Cos}(t_{ik})\,X^{*}_{i,k} & \Sigma t_i^4\mathrm{Cos}^2(t_{ik}) \end{vmatrix}$$

$$= m\{\Sigma t_i\mathrm{Sin}(t_{ik})\,X^{*}_{i,k}\,\Sigma t_i^4\mathrm{Cos}^2(t_{ik})-(\Sigma t_i^2\mathrm{Cos}(t_{ik})\,X^{*}_{i,k}\,\Sigma t_i^3\,\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik})\}$$

$$-\ \Sigma X^{*}_{i,k}\{\Sigma t_i\mathrm{Sin}(t_{ik})\,\Sigma t_i^4\mathrm{Cos}^2(t_{ik})-\Sigma t_i^2\mathrm{Cos}(t_{ik})\,\Sigma t_i^3\,\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik})\}$$

$$+\Sigma t_i^2\mathrm{Cos}(t_{ik})\{\Sigma t_i\mathrm{Sin}(t_{ik})\,\Sigma t_i^2\mathrm{Cos}(t_{ik})\,X^{*}_{i,k}-\Sigma t_i^2\mathrm{Cos}(t_{ik})\,\Sigma t_i\mathrm{Sin}(t_{ik})\,X^{*}_{i,k}\}\ldots\ldots\ldots 3.9$$

$$\Delta_3 = \begin{vmatrix} m & \Sigma t_i\mathrm{Sin}(t_{ik}) & \Sigma X^{*}_{i,k} \\ \Sigma t_i\mathrm{Sin}(t_{ik}) & \Sigma t_i^2\mathrm{Sin}^2(t_{ik}) & \Sigma t_i\mathrm{Sin}(t_{ik})\,X^{*}_{i,k} \\ \Sigma t_i^2\mathrm{Cos}(t_{ik}) & \Sigma t_i^3\,\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik}) & \Sigma t_i^2\mathrm{Cos}(t_{ik})\,X^{*}_{i,k} \end{vmatrix}$$

$$= m\{\Sigma t_i^2\mathrm{Sin}^2(t_{ik})\,\Sigma t_i^2\mathrm{Cos}(t_{ik})\,X^{*}_{i,k}-(\Sigma t_i^3\,\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_i)\,\Sigma t_i\mathrm{Sin}(t_{ik})\,X^{*}_{i,k}\}$$

$$-\Sigma t_i\mathrm{Sin}(t_{ik})\{\Sigma t_i\mathrm{Sin}(t_{ik})\,\Sigma t_i^2\mathrm{Cos}(t_{ik})\,X^{*}_{i,k}-\Sigma t_i^2\mathrm{Cos}(t_{ik})\,\Sigma t_i\mathrm{Sin}(t_{ik})\,X^{*}_{i,k}\}$$

$$+\Sigma X^{*}_{i,k}\{\Sigma t_i\mathrm{Sin}(t_{ik})\Sigma t_i^3\mathrm{Sin}(t_{ik})\mathrm{Cos}(t_{ik})-\Sigma t_i^2\mathrm{Cos}(t_{ik})\,\Sigma t_i^2\mathrm{Sin}^2(t_{ik})\}\ldots\ldots\ldots\ldots 3.10$$

Therefore, from equation 3.7, 3.8, 3.9 and 3.10, we obtain;

$$a_1 = \frac{\Delta_1}{\Delta_0} \quad \ldots\ldots 3.11$$

$$a_2 = \frac{\Delta_2}{\Delta_0} \quad \ldots\ldots 3.12$$

$$a_3 = \frac{\Delta_3}{\Delta_0} \quad \ldots\ldots 3.13$$

Then, if equation 3.11, 3.12 and 3.13 are substituted into 3.1, we have;

$$\hat{X}^{*}_{i,k} = \frac{\Delta_1}{\Delta_0}^{*} + \frac{\Delta_2}{\Delta_0} tSin(t_{ik}) + \frac{\Delta_3}{\Delta_0} t^2 Cos(t_{ik}) \quad \text{.....3.14}$$

As it has been stated above that that $X^{*}_{i,k}$ is the expected value of $X_{t,i,k}$, then the model could be reformed as below;

$$\hat{X}_{t,i,k} = \frac{\Delta_1}{\Delta_0} + \frac{\Delta_2}{\Delta_0} tSin(t_{ik}) + \frac{\Delta_3}{\Delta_0} t^2 Cos(t_{ik}) \quad \text{.....3.15}$$

The Model 3.14 and 3.15 could only be visible provided there is an occurrence within a month of any sampled year.

3.2.3 MODIFIED NONLINEAR TRIGONOMETRIC TRANSFORMATION TIME SERIES MODEL (MNTTTSM)

In situation where a many data are missing, the above model may be difficult to apply. Therefore the model for such occurrence is formulated below. This model estimate better than the model in 3.15 above with the same condition of data used.

If the data in 3.2 above are reformed such that the monthly means are as follow;

k/i	1	2	3	4	5	6	7	8	9	10	11	12	$\Sigma x_i/12$
1	$X^{*}_{1,1}$	$X^{*}_{2,1}$	$X^{*}_{3,1}$	$X^{*}_{4,1}$	$X^{*}_{5,1}$	$X^{*}_{6,1}$	$X^{*}_{7,1}$	$X^{*}_{8,1}$	$X^{*}_{9,1}$	$X^{*}_{10,1}$	$X^{*}_{11,1}$	$X^{*}_{12,1}$	X^{*}_{1}
2	$X^{*}_{1,2}$	$X^{*}_{2,2}$	$X^{*}_{3,2}$	$X^{*}_{4,2}$	$X^{*}_{5,2}$	$X^{*}_{6,2}$	$X^{*}_{7,2}$	$X^{*}_{8,2}$	$X^{*}_{9,2}$	$X^{*}_{10,2}$	$X^{*}_{11,2}$	$X^{*}_{12,2}$	X^{*}_{2}
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
k	$X^{*}_{1,k}$	$X^{*}_{2,k}$	$X^{*}_{3,k}$	$X^{*}_{4,k}$	$X^{*}_{5,k}$	$X^{*}_{6,k}$	$X^{*}_{7,k}$	$X^{*}_{8,k}$	$X^{*}_{9,k}$	$X^{*}_{10,k}$	$X^{*}_{11,k}$	$X^{*}_{12,k}$	X^{*}_{k}
	x^{*m}_{1}	x^{*m}_{2}	x^{*m}_{3}	x^{*m}_{4}	x^{*m}_{5}	x^{*m}_{6}	x^{*m}_{7}	x^{*m}_{8}	x^{*m}_{9}	x^{*m}_{10}	x^{*m}_{11}	x^{*m}	$\frac{\Sigma x^{*m}_{i}}{12} = X_{+}$

$X^{*}_{i,k} = a + b \sin(t_i^{*}) + \varepsilon_i$ where $1 \le i \le 12$, $1 \le t_i \le 365^{1}/_{4}$ 3.16

If the expected value of $\mathbf{X}^{*}_{i,k}$ is X^{*m}_{i} then the equation 3.16 can take the form ;

$X^{*m}_i = a + b \sin(t_i^*) + \varepsilon_i$ where $0<i<\infty$, $1 \leq t_i^* \leq 365^1/_4$ 3.17

An Ordinary Least Square Method is used in estimating the parameters a and b as shown below;

If $S_m = \varepsilon_i^2 = \Sigma (X^{*m}_i - (a+b\sin(t_i^*))^2$ then

$$\frac{\partial S_m}{\partial a} = -2\Sigma (X^{*m}_i - a+b\sin(t_i^*))$$

As $\frac{\partial S_m}{\partial a} \rightarrow 0$

$\Rightarrow \Sigma X^{*m}_i = 12a + b\Sigma \sin(t_i^*)$.....3.18

Also,

$$\frac{\partial S_m}{\partial b} = -2\Sigma (\sin(t_i^*) (X^{*m}_i - (a+b\sin(t_i^*)))$$

As $\frac{\partial S_m}{\partial b} \rightarrow 0$

$\Rightarrow \Sigma\sin(t_i^*) X^{*m}_i = a\Sigma\sin(t_i^*) + b\Sigma\sin^2(t_i^*)$.....3.19

Solving Equation 3.18 and 3.19 simultaneously, Using Cramer's Rule then

$$\Delta_4 = \begin{vmatrix} 12 & \Sigma \sin(t_i^*) \\ \Sigma \sin(t_i^*) & \Sigma\sin^2(t_i^*) \end{vmatrix}$$

$$= 12\Sigma Sin^2(t_i^*) - \left(\Sigma Sin\ (t_i^*)\right)^2$$

$$\Delta_5 = \begin{vmatrix} \Sigma X^{*m}_i & \Sigma \sin(t_i^*) \\ \Sigma\sin(t_i^*) X^{*m}_i & \Sigma\sin^2(t_i^*) \end{vmatrix}$$

$$= \Sigma X^{*m}_i \Sigma Sin^2(t_i^*) - \Sigma Sin(t_i^*) X^{*m}_i \Sigma Sin(t_i^*)$$

$$\Delta_6 = \begin{vmatrix} 12 & \Sigma X^{*m}_i \\ \Sigma \sin(t_i^*) & \Sigma \sin(t_i^*) X^{*m}_i \end{vmatrix}$$

$$= 12\Sigma Sin(t_i^*)X^{*m}_i - \Sigma X^{*m}_i \Sigma Sin(t_i^*)$$

Where parameters $a = \frac{\Delta_5}{\Delta_4} = \frac{\Sigma X^{*m}_i \Sigma Sin^2(t_i^*) - \Sigma Sin(t_i^*)X^{*m}_i \Sigma Sin(t_i^*)}{12\Sigma Sin^2(t_i^*) - \left(\Sigma Sin\ (t_i^*)\right)^2}$ 3.20

and

$b = \frac{\Delta_6}{\Delta_4} = \frac{12\Sigma Sin(t_i^*)X^{*m}_i - \Sigma X^{*m}_i \Sigma Sin(t_i^*)}{12\Sigma Sin^2(t_i^*) - \left(\Sigma Sin\ (t_i^*)\right)^2}$ 3.21

Therefore; the model for Monthly occurrence is;

$$X^{*m}_i = \frac{\Delta_5}{\Delta_4} + \frac{\Delta_6}{\Delta_4} Sin(t_i^*) \quad \text{.....3.22}$$

Since X^{*m}_i is an expected value for $X^*_{i,k}$ then equation 3.20 can be written as below;

$$X^*_{i,k} = \frac{\Delta_5}{\Delta_4} + \frac{\Delta_6}{\Delta_4} Sin(t_i^*) \quad \text{.....3.23}$$

Similarly, along the sampled year;

$X^{*y}_K = c + d\ Sin(\lambda k)$ for $0<k<\infty$, $30\leq\lambda\leq90$,. The λ must be chosen such that $\Sigma\varepsilon_i = 0$, $\Sigma\varepsilon_i^2$ is as minimum as possible.

If $S_y = \varepsilon_i^2 = \Sigma\ (X^{*y}_K - (c+d\sin(\lambda k))^2$ then

$$\frac{\partial S_y}{\partial c} = -2\Sigma\ (X^{*y}_K - (c+d\sin(\lambda k))$$

As $\frac{\partial S_y}{\partial c} \to 0$

$\Rightarrow \Sigma\ X^{*y}_K = nc + d\Sigma\ \sin(\lambda k)$.....3.24

Also,

$$\frac{\partial S_y}{\partial d} = -2\Sigma\,(\sin(\lambda k)\,(X^{*y}{}_K - (c+d\sin(\lambda k)))$$

As $\frac{\partial S_y}{\partial d} \to 0$

$\Rightarrow \Sigma\sin(\lambda k)\,X^{*y}{}_K = c\Sigma\sin(\lambda k) + d\Sigma\sin^2(\lambda k)$ 3.25

Solving Equation 3.24 and 3.25 simultaneously, using Cramer's Rule

Then

$$\Delta_7 = \begin{vmatrix} n & \Sigma\sin(\lambda k) \\ \Sigma\sin(\lambda k) & \Sigma\sin^2(\lambda k) \end{vmatrix}$$

$$= n\Sigma Sin^2(\lambda k) - (\Sigma Sin(\lambda k))^2$$

$$\Delta_8 = \begin{vmatrix} \Sigma X^{*y}{}_K & \Sigma\sin(\lambda k) \\ \Sigma\sin(\lambda k)\,X^{*y}{}_K & \Sigma\sin^2(\lambda k) \end{vmatrix}$$

$$= \Sigma X^{*y}{}_k \Sigma Sin^2(\lambda k) - \Sigma Sin(\lambda k) X^{*y}{}_k \Sigma Sin(\lambda k)$$

$$\Delta_9 = \begin{vmatrix} n & \Sigma X^{*y}{}_K \\ \Sigma\sin(\lambda k) & \Sigma\sin(\lambda k)\,X^{*y}{}_K \end{vmatrix}$$

$$= n\Sigma Sin(\lambda k) X^{*y}{}_k - \Sigma X^{*y}{}_k \Sigma Sin(\lambda k)$$

Where the parameters

$$c = \frac{\Delta_8}{\Delta_7} = \frac{\Sigma X^{*y}{}_k \Sigma Sin^2(\lambda k) - \Sigma Sin(\lambda k) X^{*y}{}_k \Sigma Sin(\lambda k)}{n\Sigma Sin^2(\lambda k) - (\Sigma Sin(\lambda k))^2} \quad \text{.....3.26}$$

and

$$d = \frac{\Delta_9}{\Delta_7} = \frac{n\Sigma Sin(\lambda k) X^{*y}{}_k - \Sigma X^{*y}{}_k \Sigma Sin(\lambda k)}{n\Sigma Sin^2(\lambda k) - (\Sigma Sin(\lambda k))^2} \quad \text{.....3.27}$$

$$\therefore X^{*y}{}_k = \frac{\Delta_8}{\Delta_7} + \frac{\Delta_9}{\Delta_7} Sin(\lambda k) \quad \text{.....3.28}$$

Considering the methodology for this model, it was discovered that; in getting the daily occurrences for a particular month of particular years, then we need to apply the method of getting expected occurrences in contingency table of a Chi-square by using equation 3.23 and 3.28.

Therefore, the model for expected daily occurrences is as follow;

$$X_{i,j,k} = \frac{n(X^{*m}{}_i)(X^{*y}{}_k)}{\Sigma X^{*y}{}_k} \quad \text{.....3.29}$$

If equations 3.21 and 3.26 are substituted into equation 3.27, then we obtain

$$X_{i,j,k} = \frac{n\left(\frac{\Delta_5}{\Delta_4} + \frac{\Delta_6}{\Delta_4} Sin(t_i^*)\right)\left(\frac{\Delta_8}{\Delta_7} + \frac{\Delta_9}{\Delta_7} Sin(\lambda k)\right)}{\sum_1^k \left(\frac{\Delta_8}{\Delta_7} + \frac{\Delta_9}{\Delta_7} Sin(\lambda k)\right)} \quad \text{.....3.30}$$

CHAPTER FOUR

4.0 MODEL ANALYSIS, RESULTS AND DISCUSSIONS

This Chapter is mainly on models fitting, analysis, the results and discussions. The Microsoft Excel is used to fit the parameters of the models and forecast, while Statistical Package for the Social Sciences (SPSS)(Version 10.0) were used for all the analysis of this work.

The parameters of the models were estimated, fitted, analysed, and discussed by using the data on the daily mean temperature for Ikeja, Ibadan, Ilorin, Minna and Zaria for 1987 to 1996. The results were presented in Table 1to 6 below.

TABLE. 1 The ANPTSM Fitted Models for Daily Mean Temperature (DMT) from the Year 1987 to 1996 for Estimating the Missing Values.

ZONES	Sample Size	Augmented Nonlinear Parametric Time Series Model (ANPTSM)
IKEJA	3660	$26.88642582 + 0.047971536tSin(t_{ik}) - 0.000143793t^2Cos(t_{ik})$
IBADAN	3601	$26.36612286 + 0.054847742tSin(t_{ik}) - 0.0000344912t^2Cos\,t_{ik}$
ILORIN	3580	$26.2476883 + 0.048115874tSin(t_{ik}) - 0.000833551t^2Cos(t_{ik})$
MINNA	3362	$25.72428 + 0.062853tSin(t_{ik}) - 0.00073t^2Cos(t_{ik})$
ZARIA	3588	-

TABLE. 2 The MNTTTSM Fitted Models for Daily Mean Temperature from the Year 1987 to 1996 for Estimating the Missing Values.

ZONES	Sample Size	Modified Nonlinear Trigonometric Transformation Time Series Model (MNTTTSM)
IKEJA	3660	$\dfrac{10(26.87226 + 1.420072Sin\,t_i^*)(26.88996 + 0.13116Sin60k)}{\sum_{K=1}^{10}(26.88996 + 0.1311Sin60k)}$
IBADAN	3601	$\dfrac{10(26.36749 + 1.591834Sin\,t_i^*)(26.36761 + 0.13535Sin90k)}{\sum_{K=1}^{10}(26.36761 + 0.1311Sin90k)}$

ILORIN	3580	$\frac{10(26.45708+1.816182Sin\dot{t_i})(26.40106+0.409024Sin45k)}{\sum_{K=1}^{10}(26.40106+0.409024Sin45k)}$
MINNA	3362	$\frac{10(27.56143+2.508736Sin\dot{t_i})(27.67047+0.112148Sin90k)}{\sum_{K=1}^{10}(27.67047+0.112148Sin90k)}$
ZARIA	3588	$\frac{10(24.98532+1.210108Sin\dot{t_i})(25.00445+0.222282Sin90k)}{\sum_{K=1}^{10}(25.00445+0.222282Sin90k)}$

Table 1 presents the fitted ANPTSM models for Ikeja, Ibadan, Ilorin and Minna as described in 3.15 above. These were derived as a result of using the data of their daily mean temperature to estimate their parameters. We could see from the table that the fitted model for Zaria could not be formulated due to the fact that many months' data were missed. This is one of the limitations of ANPTSM

Table 2 presents the fitted MNTTTSM models for Ikeja, Ibadan, Ilorin, Minna and Zaria as described in 3.30 above. These also were derived as a result of using the data of their daily mean temperature to estimate their parameters. The fitted model for Zaria was formulated because MNTTTSM has the strength of addressing the problem of monthly missing values. Even though many months' data were missed in Zaria's daily mean temperature, MNTTTSM parameters could still be estimated. This is one of the advantages of MNTTTSM over ANPTSM

TABLE 3. CORRELATION CO-EFFICIENTS OF ANPTSM AND MNTTTSM ESTIMATES WITH THE ACTUAL DMT.

ZONES		ANPTSM		MNTTTSM	
	TYPES	CO-EFFICIENTS	SIG.	CO-EFFICIENTS	SIG.
IKEJA	PEARSON COR.	0.607	.000	0.607	.000
IBADAN	PEARSON COR.	0.594	.000	0.575	.000
ILORIN	PEARSON COR.	0.503	.000	0.589	.000
MINNA	PEARSON COR.	0.596	.000	0.676	.000
ZARIA	PEARSON COR.	-	-	0.419	.000

From the Table 3 above, the results of calculating the Pearson Product Moment Correlation Coefficients for Ikeja, Ibadan, Ilorin and Minna are highly and positively correlated which indicate the strong relationship between the actual data and Estimated data of the daily mean temperature, while in Zaria the correlation coefficient for MNTTTSM is positive but low. However, they are all significant.

Apart from Ibadan in which the correlation coefficient in ANPTSM is greater than MNTTTSM and Ikeja which is having equal Correlation Coefficient, then in all other Zones, the correlation coefficient in MNTTTSM is greater than ANPTSM. This indicates that MNTTTSM has stronger relationship between their actual and estimated values than ANPTSM. Although the relationship between actual and estimated values of MNTTTSM in Zaria is weak but positive, while that of ANPTSM could not be estimated at all due to many months missing values.

Also, all the correlations are significant at the 0.01 level (2-tailed).

TABLE 4. COMPARISON OF ANPTSM AND MNTTTSM'S MEANS FOR ESTIMATES WITH THE ACTUAL DMT

ZONES	N	ANPTSM		MNTTTSM	
		ACTUAL	ESTIMATED	ACTUAL	ESTIMATED
IKEJA	3660	26.9077	26.8759	26.9077	26.8759
IBADAN	3601	26.3749	26.3756	26.3749	26.3791
ILORIN	3580	26.4558	26.2443	26.4558	26.4593
MINNA	3362	27.5489	26.3611	27.5489	27.5559
ZARIA	3588	-	-	25.0514	25.0172

In estimating the parameters of the two models (ANPTSM and MNTTTSM) we applied Least Square Method, and one of the characteristics of Least Square is that the sum of the deviations between the actual and estimated values must equal to Zero i.e. the sum of the actual data must equal to the sum of the estimated data and which implies that their mean must be equal.

Therefore, we could see from the Table 4 above that the mean of the actual and estimated values for each zones of each models are almost equal. The little differences there are due to approximation (truncate error) during calculation. Also, the means of actual and estimated values of MNTTTSM are closer than that of ANPTSM, which implies that MNTTTSM estimates better than ANPTSM.

It was also discovered from the table 4 that the more missing values we have in data, the weaker the ANPTSM in estimating the parameters of the models, while in MNTTTSM, the model would not be as weak as that of ANPTSM.

TABLE 5. COMPARISON OF ANPTSM'S STANDARD DEVIATION AND STANDARD ERROR OF DIFFERENCES BETWEEN THE ESTIMATES AND ACTUAL DMT WITH THAT OF MNTTTSM.

ZONES	ANPTSM		MNTTTSM	
	STD. DEV.	STD. ERROR MEAN	STD. DEV.	STD. ERROR MEAN
IKEJA	1.2138	0.02006	1.2137	0.02006
IBADAN	1.3913	0.02319	1.3882	0.02313
ILORIN	1.8585	0.03106	1.6996	0.02841
MINNA	2.1381	0.03688	1.8293	0.03155
ZARIA	-	-	2.7152	0.04533

From the table 5 above, we discovered that the standard deviations for MNTTTSM are lesser than that of ANPTSM, which indicate that MNTTTSM is better in estimating and forecasting than ANPTSM.

Similarly, apart form the standard error of ANPTSM and MNTTTSM of Ikeja which are equal, it was discovered that the standard errors for MNTTTSM were also smaller than that of ANPTSM which indicate that MNTTTSM is better in estimating and forecasting than ANPTSM for a time series data with missing values.

TABLE6. COMPARISON OF ANPTSM'S 95 % CONFIDENCE INTERVAL OF THE DIFFERENCES BETWEEN THE ESTIMATES AND ACTUAL DMT WITH THAT OF MNTTSM

ZONES	ANPTSM		MNTTTSM	
	LOWER	UPPER	LOWER	UPPER
IKEJA	-0.00749	0.07119	-0.00748	0.07118
IBADAN	-0.0462	0.04473	-0.0496	0.04114
ILORIN	0.1505	0.2723	-0.0592	0.05218
MINNA	1.1155	1.2601	-0.0689	0.05482
ZARIA	-	-	-0.0546	0.12310

From the table 6, we discovered that at Ikeja we are 95% sure that the differences between the actual and estimated daily mean temperature would lie between -0.00749 and 0.07119 in ANPTSM and -0.00748 and 0.07118 in MNTTTSM. Similarly, at Ibadan; -0.0462 and 0.04473 in ANPTSM and -0.0496 and 0.04114 in MNTTTSM, at Ilorin; 0.1505 and 0.2723 in ANPTSM and -0.0592 and 0.05218 in MNTTTSM, at Minna; 1.1155 and 1.2601 in ANPTSM and -0.0689 and 0.05482 in MNTTTSM while in Zaria is between -0.0546 and 0.12310.

It was also discovered that the range of the confidence interval for MNTTTSM is lesser than that of ANPTSM for Ikeja and Ibadan. Also for Ilorin and Minna, the lower confidence interval of differences for ANPTSM is positive which indicate that we are 95% sure that the differences between their actual and estimated daily temperature (actual – estimate) are positive. This implies that the estimated daily temperatures for Ilorin and Minna were under-estimated by ANPTSM.

Hence MNTTTSM is better in estimating and forecasting than ANPTSM when there are missing values in the data.

4.1 FORECASTING OF DAILY MEAN TEMPERATURES

Forecasting means extrapolating the observations available up to time t to predict observations at future times. The data on the daily mean temperature for Ikeja, Ibadan, Ilorin and Minna for 1987 to 1994 were used to estimate the parameters in an ANPTSM and MNTTTSM and that of Zaria was used to estimate the parameters for MNTTTSM only as we earlier discussed under Table 1 and 2 of this chapter. The parameters of the models were used to forecast for the year 1995 and 1996, which are analyzed and shown graphically below. The results were also shown in the appendix 1to 5 of this thesis.

TABLE. 7 The ANPTSM Fitted Models for Daily Mean Temperature (DMT) from the Year 1987 to 1994 to forecast for 1995 and 1996.

Zones	Sample Sizes	Augmented Nonlinear Parametric Time Series Model (ANPTSM)
IKEJA	2928	$26.91968972 + 0.049607343tSin(t_{ik}) - 0.000592357t^2Cos(t_{ik})$
IBADAN	2870	$26.34107939 + 0.054963902tSin(t_{ik}) + 0.0000952106t^2Cos\,t_{ik}$
ILORIN	2849	$26.05683156 + 0.044127105\text{tSin}(t_{ik}) - 0.000823393t^2Cos(t_{ik})$
MINNA	2631	$25.219665 + 0.0611105tSin(t_{ik}) - 0.000468t^2Cos(t_{ik})$
ZARIA	2857	-

TABLE. 8. The MNTTTSM Fitted Models for Daily Mean Temperature (DMT)from the Year 1987 to 1994 to forecast for 1995 and 1996.

Zones	Sample Sizes	Modified Nonlinear Trigonometric Transformation Time Series Model (MNTTTSM)
IKEJA	2928	$\frac{8(26.9261 + 1.476649Sin\dot{t}_i)(26.90983 + 0.116971Sin60k)}{\sum_{K=1}^{8}(26.90983 + 0.116971Sin60k)}$
IBADAN	2870	$\frac{8(26.34215 + 1.602779Sin\dot{t}_i)(26.35591 + 0.113495Sin90k)}{\sum_{K=1}^{8}(26.35591 + 0.113495Sin90k)}$
ILORIN	2849	$\frac{8(26.31629 + 1.780715Sin\dot{t}_i)(26.33196 + 0.295834Sin45k)}{\sum_{K=1}^{8}(26.33196 + 0.295834Sin45k)}$

MINNA	2631	$\frac{10(27.56143+2.508736Sin\dot{t_i})(27.67047+0.112148Sin90k)}{\sum_{K=1}^{10}(27.67047+0.112148Sin90k)}$
ZARIA	2857	$\frac{10(24.98532+1.210108Sin\dot{t_i})(25.00445+0.222282Sin90k)}{\sum_{K=1}^{10}(25.00445+0.222282Sin90k)}$

Table 7 presents the fitted ANPTSM models for Ikeja, Ibadan, Ilorin and Minna as derived in 3.15 above. These were derived as a result of using the data of their daily mean temperature from 1987 to 1994 to estimate their parameters. The parameters were used to forecast for the daily mean temperature for the year 1996 and 1997. Similarly, table 8 is the fitted MNTTTSM as derived in 3.30 above.

TABLE 9 CORRELATION CO-EFFICIENTS FOR ANPTSM AND MNTTTSM'S FORECAST WITH THEIR ACTUAL DMT

ZONES		ANPTSM		MNTTTSM	
	TYPES	CO-EFFICIENTS	SIG.	CO-EFFICIENTS	SIG.
IKEJA	PEARSON COR.	0.623	.000	0.587	.000
IBADAN	PEARSON COR.	0.642	.000	0.565	.000
ILORIN	PEARSON COR.	0.516	.000	0.515	.000
MINNA	PEARSON COR.	0.650	.000	0.723	.000
ZARIA	PEARSON COR.	-	-	0.499	.000

Table 9 presents the results of calculating the Pearson Product Moment Correlation Coefficients between the actual and forecasted daily mean temperature for Ikeja, Ibadan, Ilorin and Minna. We could see that the more missing values we have in the sampled observation the better is the relationship between the actual observations and forecasted observation of MNTTTSM than that of ANPTSM.

Also, all the correlations are significant at the 0.01 level (2-tailed).

TABLE 10. COMPARISON OF ANPTSM AND MNTTTSM'S MEANS FOR FORECAST WITH THE ACTUAL DMT.

ZONES	N	ACTUAL	ANPTSM ESTIMATED	MNTTTSM ESTIMATED
IKEJA	732	26.83934	26.92780	26.85390
IBADAN	731	26.4688	26.34823	26.40099
ILORIN	731	27.0153	26.05887	26.57117
MINNA	731	27.7387	25.22596	27. 57076
ZARIA	731	25.3863	-	25.07766

Table 10 shows the expected actual and forecasted daily mean temperatures for ANPTSM and MNTTTSM for each zone from the year 1995 to 1996. We could discover that MNTTTSM's expected daily mean temperature is closer in all the zones to the expected actual daily mean temperature than that of ANPTSM. This shows that MNTTTSM forecast better than ANPTSM.

TABLE 11. COMPARISON OF ANPTSM'S STANDARD DEVIATION AND STANDARD ERROR OF DIFFERENCES BETWEEN THE FORECASTS AND ACTUAL WITH THAT OF MNTTTSM.

ZONES	ANPTSM		MNTTTSM	
	STD. DEV.	STD. ERROR MEAN	STD. DEV.	STD. ERROR MEAN
IKEJA	1.1644199	0.0430	1.1874079	0.0439
IBADAN	1.2699568	0.0470	1.3407029	0.0496
ILORIN	2.0315331	0.0751	1.9562464	0.0724
MINNA	1.9994163	0.0740	1.6736132	0.0619
ZARIA	-	-	2.4264186	0.0897

From the table 11 above, we could discovered that the more missing values we have in the sampled data the lesser the standard deviations and standard error for MNTTTSM than that of ANPTSM which indicate that MNTTTSM is better in handling missing values than ANPTSM.

THE GRAPHS OF THE FORECASTED DAILY MEAN TEMPERATURE FROM THE YEAR 1995 TO 1996.

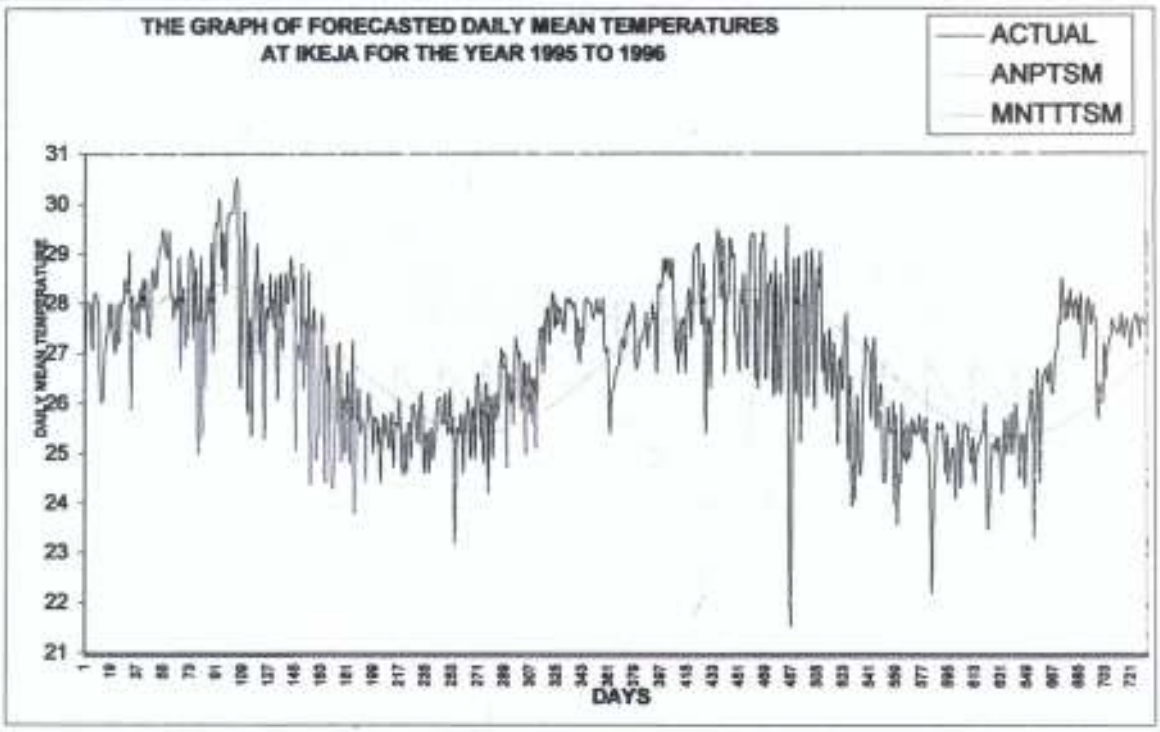

Fig.1

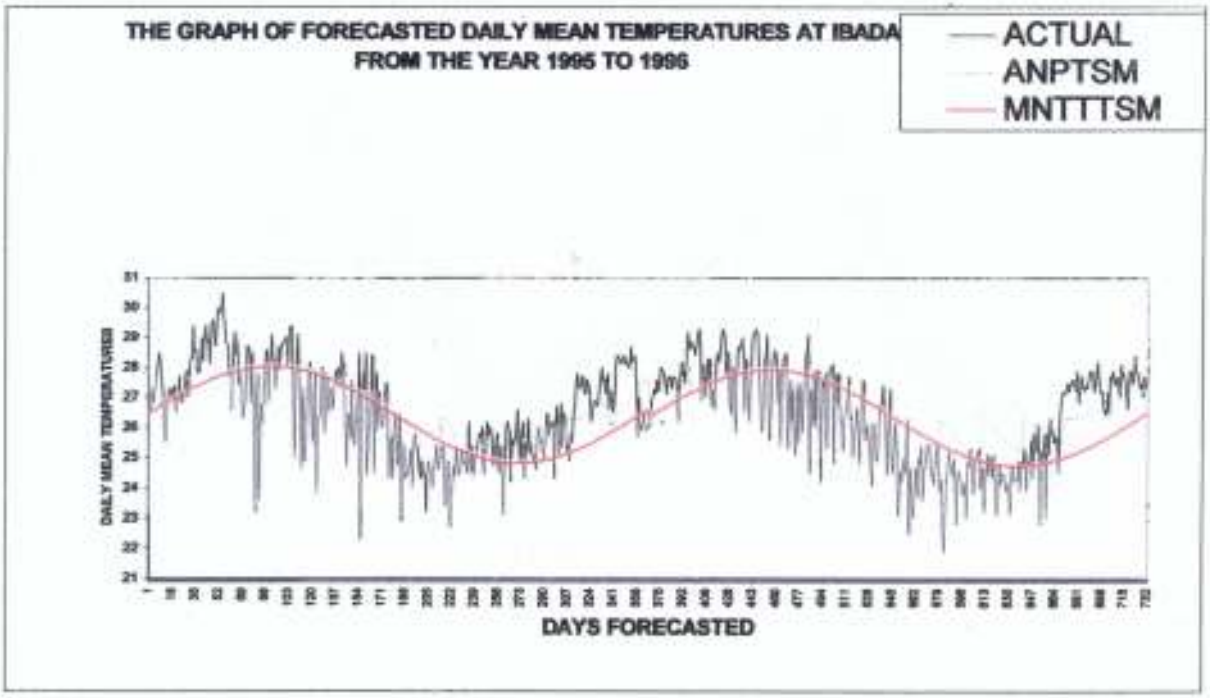

Fig.2

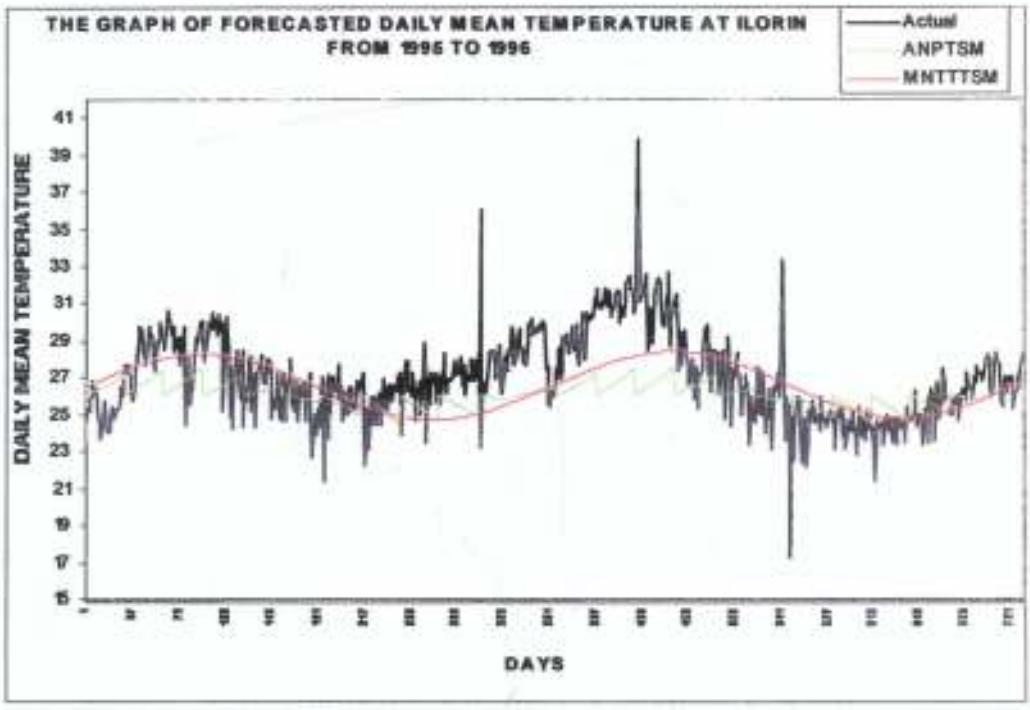
THE GRAPH OF FORECASTED DAILY MEAN TEMPERATURE AT ILORIN
FROM 1995 TO 1996
Actual
ANPTSM
MNTTTSM
DAILY MEAN TEMPERATURE
DAYS

Fig.3

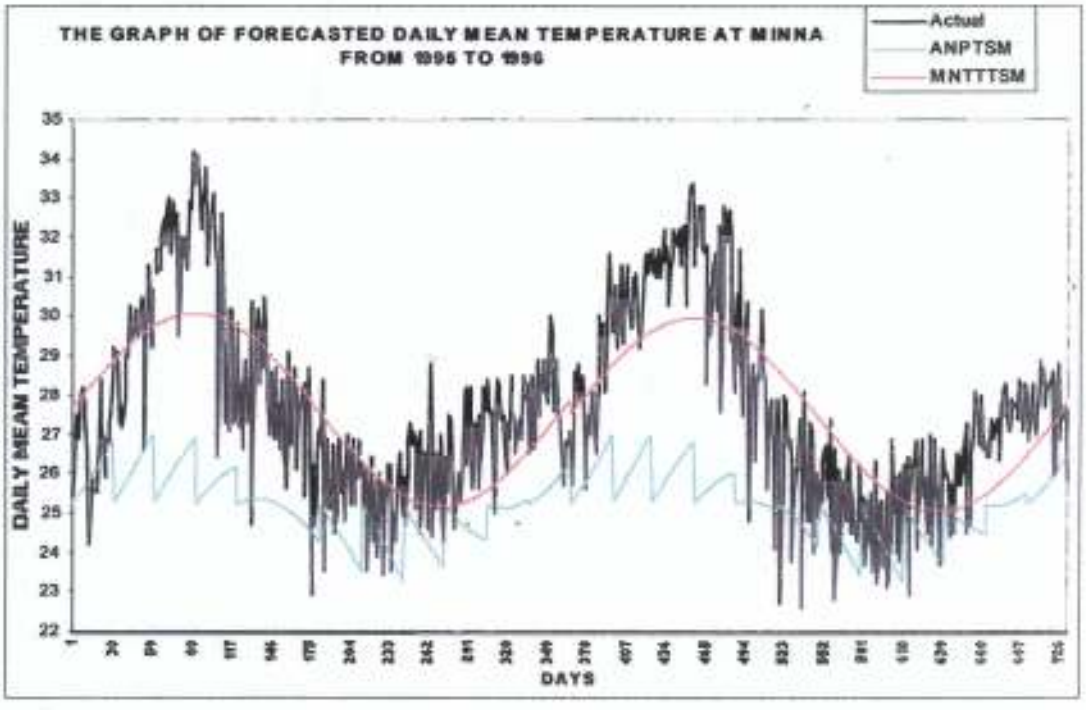
THE GRAPH OF FORECASTED DAILY MEAN TEMPERATURE AT MINNA
FROM 1995 TO 1996
Actual
ANPTSM
MNTTTSM
DAILY MEAN TEMPERATURE
DAYS

Fig. 4

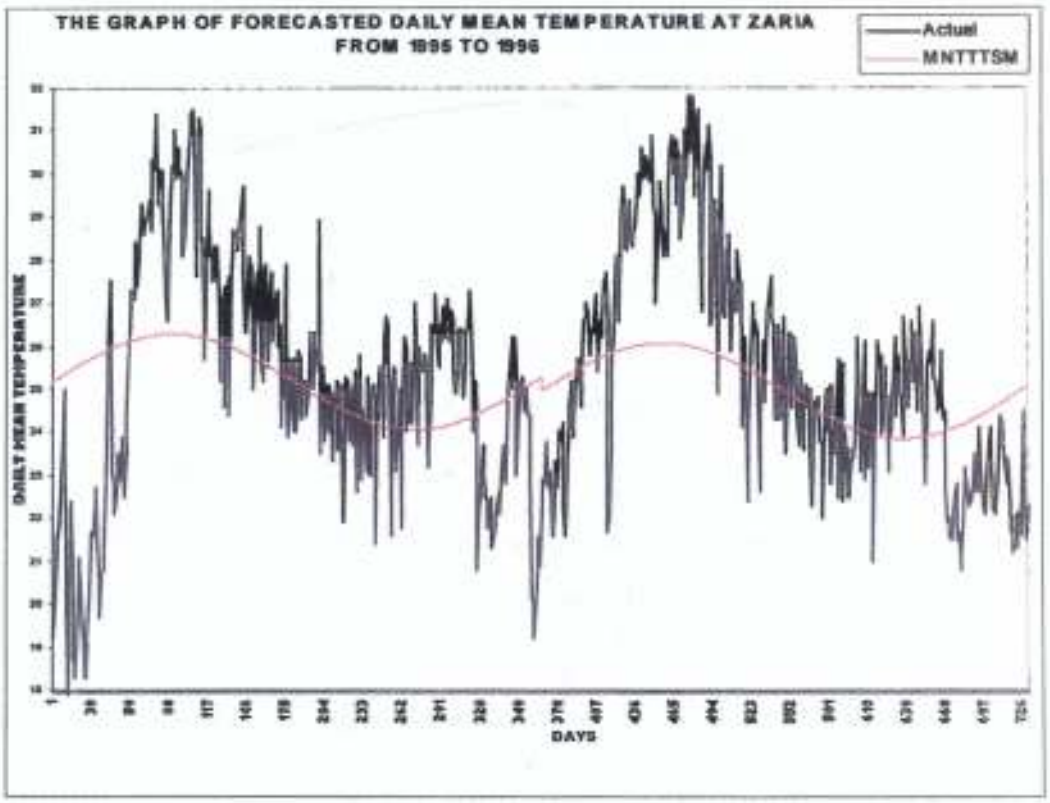

Fig. 5

Fig 1 to 5 shows the graphical trends of the actual daily mean temperature (———), ANPTSM (– – –) and MNTTTSM's (— — —) forecasted daily mean temperature for Ikeja, Ibadan, Ilorin, Minna and Zaria respectively. We could discover that in Fig 1, 2 and 3, the trends of the ANPTSM and MNTTTSM fall within the actual trends, which showed that they were able to forecast well. In fig. 4, ANPTSM trend falls below the actual trend, which shows that its forecast is below the actual while that of MNTTTSM falls within to show that it forecast better than ANPTSM in a situation where there is much missing values. In fig.5, the fact that many months' values were missing, MNTTTSM trend falls within actual trend while ANPTSM parameters could not be estimated to forecast.

CHAPTER FIVE

5.0 SUMMARY ,CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

Chapter one of this work provided introduction to Nonlinear Time Series Modelling; objectives of the model and important of the model while in chapter two of the work is explication of various scholarly works on Nonlinear Time Series Modelling.

In chapter three, two models were formulated. One of the models was reviewed based on Gallant, (1981) discussion i.e Flexible Statistical Parametric Model using trigonometric functions (sine and cosine) augmented by quadratic term called Augmented Nonlinear Parametric Time Series Model (ANPTSM) (equation 3.15 of this work). The second model was formulated based on trigonometric function (sine only) and the knowledge of calculating the expected values in contingency table of Chi-Square for two or more sample cases. This is called Modified Nonlinear Trigonometric Transformation Time Series Model (equation 3.30 of this work).

In chapter four, the results of the analysis of the models using different daily mean temperatures (for Ikeja, Ibadan, Ilorin, Minna and Zaria) for ten years (1987 to 1996) were practically tested and compared. The actual and estimated daily mean temperatures were analyzed for ANPTSM and MNTTTSM and discovered that the latter model is more efficient. Also the parameters for Ikeja, Ibadan, Ilorin, Minna and Zaria's daily mean temperatures for 1987 to 1994 were estimated to forecast for 1995 to 1996, which were presented graphically in fig1 to 5.

Chapter five is the Summary, Conclusion and the Recommendation of the research works done in this work while in Appendix 1-5 are the results of the forecasted daily mean temperatures at Ikeja, Ibadan, Ilorin, Minna and Zaria respectively from the year 1995 to 1996 using ANPTSM and MNTTTSM models.

The two models ANPTSM and MNTTTSM were specifically designed for modeling the daily means of temperature in Nigeria. This was done because of non-linearity properties exhibited by the data. Interestingly, it was discovered that the two techniques gave consistent and reliable parameter estimate for models of all the five towns considered in Nigeria. The forecast for two years daily mean temperature that was carried out showed that it has minimum variance when the differences for the two techniques were examined. This was true for all the five town considered (See Appendix 1 to 5). Also when it comes to situation of missing values in the time series data MNTTTSM handles it better.

5. 2. CONCLUSION

Two models were formulated; one of the models was adopted while the other model was formulated as stated above (2.0, i, ii). The models were tested using daily mean temperatures at Ikeja, Ibadan, Ilorin, Minna and Zaria, and the results were analyzed. It was discovered that ANPTSM could be used in forecasting provided the missing data is spread within the month. In case of MNTTTSM, it estimates and forecasts better than ANPTSM, even if some months' values are missing and the rest values are spread over the year.

Conclusively, it was discovered that MNTTTSM is more efficient in estimating missing values. In a situation, which there is much missing values it forecasts better than ANPTSM based on the analysis and discussions in chapter four of this work.

However, ANPTSM could still be used in forecasting and estimating missing values provided the missing values are spread within the month as in case of daily mean temperature for Ibadan and Ilorin.

5.3. RECOMMENDATION

The main aim of good model developed for Nonlinear Time Series Modelling is to be able to forecast better, the new method (MNTTTTSM) is therefore recommended for numerical solutions for nonlinear data with missing values because of higher capacity of catering for missing values. Further research work could still be carried out on the situation in which a data is having a year or more missing values.

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APPENDIX 3

THE RESULTS OF FORCASTED DAILY MEAN TEMPERATURE AT IKEJA FROM THE YEAR 1995 TO 1996

ANPTSM	Dev^2	Years	Days	Months	Actual		Dev^2
26.9534785	0.00216425	1995	1	JAN.	27	26.926535	0.005397
26.9884396	1.02325446		2		28	26.952274	1.097729
27.0245458	0.95151087		3		28	26.977998	1.044489
27.0617695	0.88027649		4		28	27.003698	0.992619
27.1000823	0.03996708		5		27.3	27.029366	0.073243
27.1394555	0.00155673		6		27.1	27.054995	0.002025
27.1798594	1.04068677		7		28.2	27.080578	1.253107
27.2212643	0.95792358		8		28.2	27.106105	1.196606
27.2636395	0.54222679		9		28	27.13157	0.75417
27.306954	0.48031275		10		28	27.156965	0.710708
27.3511762	1.10497149		11		26.3	27.182282	0.778421
27.3962741	1.9495815		12		26	27.207512	1.458086
27.4422152	1.54309854		13		26.2	27.23265	1.066366
27.4889663	0.23908804		14		27	27.257686	0.066402
27.536494	0.11322823		15		27.2	27.282614	0.006825
27.5847644	0.00718501		16		27.5	27.307426	0.037085
27.6337432	0.13414405		17		28	27.332113	0.446073
27.6833955	0.0336339		18		27.5	27.356669	0.020544
27.7336861	0.07092307		19		28	27.381086	0.383054
27.7845796	0.2348174		20		27.3	27.405357	0.0111
27.8360399	0.69896279		21		27	27.429475	0.184449
27.8880308	0.47338644		22		27.2	27.453431	0.064227
27.9405157	0.00353838		23		28	27.477219	0.2733
27.9934575	0.62957476		24		27.2	27.500831	0.090499
28.046819	0.00219201		25		28	27.524261	0.226328
28.1005625	0.01011282		26		28	27.5475	0.204756
28.1546504	0.02391674		27		28	27.570543	0.184433
28.2090444	0.08465519		28		26.5	27.593382	0.821957
28.2637061	0.00405846		29		28.2	27.616009	0.341045
28.318597	0.00662645		30		28.4	27.638419	0.580006
28.3736782	0.39227901		31		29	27.660604	1.793982
26.967359	1.1392553		32	FEB.	25.9	27.682558	3.177512
27.0154624	1.17622176		33		28.1	27.704273	0.1566
27.0639621	0.19012903		34		27.5	27.725744	0.05096
27.1128202	0.47221614		35		27.8	27.746963	0.002813
27.1619983	0.70224678		36		28	27.767925	0.053859
27.2114583	0.03554796		37		27.4	27.788623	0.151028
27.2611616	1.07918528		38		28.3	27.80905	0.241032
27.3110694	0.34683923		39		27.9	27.8292	0.005013
27.3611431	1.29699512		40		28.5	27.849068	0.423713
27.4113436	0.23878508		41		27.9	27.868647	0.000983
27.461632	1.07820813		42		28.5	27.887931	0.374629
27.5119692	0.00014326		43		27.5	27.906914	0.165579
27.5623159	0.06880964		44		27.3	27.925591	0.391364
27.6126331	0.04521283		45		27.4	27.943955	0.295888
27.6628814	0.7007675		46		28.5	27.962002	0.289441
27.7130217	0.97412623		47		28.7	27.979726	0.518795
27.7630146	0.28835337		48		28.3	27.997121	0.091736
27.8128208	0.23734353		49		28.3	28.014182	0.081692
27.8624014	0.54405175		50		28.6	28.030904	0.32387
27.9117169	1.41201663		51		29.1	28.047282	1.108216
27.9607285	1.29793954		52		29.1	28.06331	1.074726

28.0093971	1.66565593	53		29.3	28.078984	1.490879
28.0576837	2.08027621	54		29.5	28.0943	1.975993
28.1055497	1.42671145	55		29.3	28.109251	1.417882
28.1529564	0.5580741	56		28.9	28.123835	0.602432
28.1998653	0.81024243	57		29.1	28.138046	0.925355
28.2462381	1.33116645	58		29.4	28.151881	1.557802
28.2920367	0.00847075	59		28.2	28.165334	0.001202
28.3033922	0.04136837	59.25		28.1	28.168637	0.004711
26.9681801	0.53556033	60.25	MAR	27.7	28.181608	0.231947
27.0163175	1.17436766	61.25		28.1	28.194189	0.008872
27.0640639	1.07316369	62.25		28.1	28.206376	0.011316
27.1113812	0.62191968	63.25		27.9	28.218165	0.101229
27.1582317	3.03375671	64.25		28.9	28.229553	0.449499
27.2045781	0.25459906	65.25		26.7	28.240537	2.373253
27.250383	0.56192558	66.25		28	28.251112	0.063057
27.2956096	1.0088001	67.25		28.3	28.261276	0.0015
27.340221	0.05770615	68.25		27.1	28.271025	1.371299
27.384181	0.17290545	69.25		27.8	28.280357	0.230743
27.4274533	0.01624436	70.25		27.3	28.289269	0.978653
27.4700024	2.04489328	71.25		28.9	28.297757	0.362696
27.5117926	2.52240287	72.25		29.1	28.305821	0.630721
27.5527889	1.55553553	73.25		28.8	28.313456	0.236725
27.5929567	0.08582361	74.25		27.3	28.320661	1.041749
27.6322615	1.14006545	75.25		28.7	28.327434	0.138806
27.6706696	0.39605679	76.25		28.3	28.333771	0.001141
27.7081473	7.33406166	77.25		25	28.339673	11.15342
27.7446616	0.41558854	78.25		27.1	28.345136	1.550364
27.7801798	1.25399726	79.25		28.9	28.350159	0.302325
27.8146698	6.32356428	80.25		25.3	28.354741	9.331441
27.8480999	0.02193358	81.25		27.7	28.35888	0.434122
27.8804388	2.49778676	82.25		26.3	28.362574	4.254212
27.9116558	0.15081122	83.25		28.3	28.365824	0.004333
27.9417207	0.12836404	84.25		28.3	28.368627	0.00471
27.9706039	0.02910568	85.25		27.8	28.370983	0.326021
27.9982761	1.44414039	86.25		29.2	28.372891	0.68411
28.0247088	1.05002808	87.25		27	28.37435	1.888839
28.0498739	0.30263869	88.25		28.6	28.375361	0.050463
28.0737441	2.32945705	89.25		29.6	28.375923	1.498364
28.0962924	2.26113645	90.25		29.6	28.376035	1.498089
26.9558629	9.88559838	91.25	APRIL	30.1	28.375698	2.973216
26.9909227	8.46273057	92.25		29.9	28.374912	2.325893
27.0248412	2.80615689	93.25		28.7	28.373677	0.106487
27.0575909	5.48688059	94.25		29.4	28.371993	1.056799
27.0891447	1.23399954	95.25		28.2	28.369861	0.028853
27.1194764	2.19195014	96.25		28.6	28.367281	0.054158
27.1485603	5.52926853	97.25		29.5	28.364255	1.289918
27.1763714	6.88342691	98.25		29.8	28.360783	2.071347
27.2028853	6.74500487	99.25		29.8	28.356866	2.082637
27.2280782	6.614782	100.25		29.8	28.352505	2.095241
27.251927	7.01229086	101.25		29.9	28.347703	2.409627
27.2744093	9.1541992	102.25		30.3	28.342459	3.831965
27.2955034	10.2687984	103.25		30.5	28.336777	4.679534
27.3151883	7.75517604	104.25		30.1	28.330657	3.130575
27.3334437	0.11118471	105.25		27	28.324102	1.753245
27.3502499	1.10302494	106.25		26.3	28.317113	4.068743
27.3655882	0.53936076	107.25		28.1	28.309692	0.043971

27.3794402	4.08266194	108.25		29.4	28.301842	1.20595
27.3917886	5.79948194	109.25		29.8	28.293566	2.269343
27.4026168	0.00948348	110.25		27.5	28.284865	0.616014
27.4119089	2.59825031	111.25		25.8	28.275743	6.129305
27.4196497	0.07859631	112.25		27.7	28.266202	0.320585
27.4258247	4.10396589	113.25		25.4	28.256245	8.158137
27.4304206	1.51393477	114.25		26.2	28.245875	4.185606
27.4334243	0.32100801	115.25		28	28.235096	0.05527
27.434824	1.13459998	116.25		28.5	28.22391	0.076226
27.4346083	3.11660785	117.25		29.2	28.212321	0.97551
27.4327669	0.58864664	118.25		28.2	28.200332	1.1E-07
27.4292901	0.18429001	119.25		27	28.187948	1.41122
27.4241692	0.76707958	120.25		28.3	28.175171	0.015582
26.9340431	2.14902965	121.25	MAY	28.4	28.162007	0.056641
26.9468486	2.71211046	122.25		25.3	28.148458	8.113711
26.9580957	0.02013684	123.25		27.1	28.134529	1.07025
26.9677742	0.86904496	124.25		27.9	28.120224	0.048499
26.9758752	0.52435678	125.25		27.7	28.105548	0.164469
26.9823903	2.61666122	126.25		28.6	28.090505	0.259585
26.9873121	0.83299927	127.25		27.9	28.075099	0.03066
26.9906339	1.23069319	128.25		28.1	28.059336	0.001654
26.9923499	0.25770862	129.25		27.5	28.04322	0.295088
26.9924551	2.27269148	130.25		28.5	28.026756	0.22396
26.9909455	0.7937838	131.25		26.1	28.009948	3.647903
26.9878175	0.01258491	132.25		27.1	27.992803	0.797098
26.9830688	2.61446648	133.25		28.6	27.975326	0.390218
26.9766977	0.01520345	134.25		27.1	27.957521	0.735342
26.9687034	0.18601674	135.25		27.4	27.939394	0.290946
26.9590859	2.69259896	136.25		28.6	27.920951	0.461108
26.9478462	1.32745849	137.25		28.1	27.902197	0.039126
26.9349858	1.13425532	138.25		28	27.883138	0.013657
26.9205073	1.90300003	139.25		28.3	27.863779	0.190288
26.9044142	3.59324541	140.25		28.8	27.844128	0.913692
26.8867107	4.05333381	141.25		28.9	27.824189	1.157369
26.8674018	1.51929831	142.25		28.1	27.803969	0.087635
26.8464934	2.73408391	143.25		28.5	27.783473	0.51341
26.8239924	2.9721497	144.25		25.1	27.762709	7.09002
26.7999061	0.00998124	145.25		26.7	27.741682	1.085102
26.7742432	0.18126887	146.25		27.2	27.7204	0.270816
26.7470127	0.02340511	147.25		26.9	27.698867	0.638188
26.7182248	4.33378813	148.25		28.8	27.677091	1.260924
26.6878903	0.16983444	149.25		27.1	27.655079	0.308113
26.6560209	0.12675086	150.25		26.3	27.632837	1.776455
26.6226291	1.16072798	151.25		27.7	27.610372	0.008033
26.9075361	0.01156402	152.25	JUNE	26.8	27.587691	0.620458
26.8938218	2.91104419	153.25		28.6	27.564801	1.071637
26.8785568	6.14324392	154.25		24.4	27.541709	9.870333
26.8617523	0.02616381	155.25		26.7	27.518421	0.669813
26.84342	1.1163613	156.25		27.9	27.494945	0.16407
26.8235725	0.33226865	157.25		27.4	27.471288	0.005082
26.8022232	3.61845323	158.25		24.9	27.447457	6.489539
26.7793863	2.18858393	159.25		25.3	27.42346	4.509083
26.7550768	1.83623308	160.25		25.4	27.399304	3.997216
26.7293103	0.07327291	161.25		27	27.374996	0.140622
26.7021034	1.20537692	162.25		27.8	27.350543	0.202012
26.6734734	0.05131432	163.25		26.9	27.325953	0.181436

26.6434382	5.03301494	164.25		24.4	27.301234	8.417159
26.6120167	0.23812773	165.25		27.1	27.276393	0.031114
26.5792283	0.03212278	166.25		26.4	27.251437	0.724945
26.5450933	0.02399608	167.25		26.7	27.226375	0.27707
26.5096327	2.27899094	168.25		25	27.201213	4.84534
26.4728682	4.72135608	169.25		24.3	27.17596	8.271147
26.4348221	4.14050086	170.25		24.4	27.150623	7.565928
26.3955175	1.67836562	171.25		25.1	27.12521	4.101476
26.3549783	0.06003564	172.25		26.6	27.099729	0.249729
26.3132288	0.78636311	173.25		27.2	27.074187	0.015829
26.2702943	0.86435269	174.25		27.2	27.048592	0.022924
26.2262005	1.75880772	175.25		24.9	27.022952	4.506926
26.1809738	0.46372535	176.25		25.5	26.997275	2.241833
26.1346414	0.00120003	177.25		26.1	26.971569	0.759632
26.0872309	1.18207107	178.25		25	26.945841	3.786296
26.0387707	0.13048659	179.25		26.4	26.920099	0.270503
25.9892897	0.37296702	180.25		26.6	26.894351	0.086643
25.9388175	1.2969053	181.25		24.8	26.868606	4.27913
26.8851166	0.97045475	182.25	JULY	25.9	26.84287	0.889004
26.8493957	0.12292337	183.25		27.2	26.817152	0.146573
26.8125547	9.07548588	184.25		23.8	26.791459	8.948828
26.7746219	8.84837553	185.25		23.8	26.7658	8.795968
26.7356262	0.69827114	186.25		25.9	26.740181	0.705905
26.695597	0.15649699	187.25		26.3	26.714612	0.171903
26.6545643	1.57393163	188.25		25.4	26.689099	1.661777
26.6125587	0.83276333	189.25		25.7	26.663651	0.928624
26.5696111	1.14406794	190.25		25.5	26.638275	1.295671
26.5257532	0.85701901	191.25		25.6	26.612979	1.026127
26.481017	4.33063185	192.25		24.4	26.587771	4.786342
26.4354351	0.18960373	193.25		26	26.562658	0.316584
26.3890405	0.0357363	194.25		26.2	26.537648	0.114006
26.3418666	0.2936194	195.25		25.8	26.512749	0.508011
26.2939474	0.35277351	196.25		25.7	26.487968	0.620893
26.2453172	1.55081504	197.25		25	26.463312	2.141283
26.1960109	0.2460268	198.25		25.7	26.43879	0.545811
26.1460635	0.19897265	199.25		25.7	26.414409	0.51038
26.0955106	0.80193931	200.25		25.2	26.390176	1.416518
26.0443882	0.29635854	201.25		25.5	26.366098	0.750125
25.9927325	2.53679692	202.25		24.4	26.342183	3.772075
25.9405802	0.54845902	203.25		25.2	26.318438	1.250904
25.8879681	0.00773839	204.25		25.8	26.294871	0.244897
25.8349336	0.18916728	205.25		25.4	26.271488	0.759492
25.7815143	0.00664457	206.25		25.7	26.248297	0.30063
25.7277478	0.18296819	207.25		25.3	26.225305	0.856189
25.6736724	0.32910002	208.25		25.1	26.202519	1.215547
25.6193264	0.00037351	209.25		25.6	26.179945	0.336336
25.5647483	0.05534337	210.25		25.8	26.15759	0.127871
25.5099769	0.65606286	211.25		24.7	26.135463	2.060553
25.4550513	0.02101011	212.25		25.6	26.113568	0.263752
26.8717322	1.88164929	213.25	AUGUST	25.5	26.091913	0.350361
26.8233746	1.26197058	214.25		25.7	26.070504	0.137274
26.774655	0.45515931	215.25		26.1	26.049349	0.002566
26.7256113	1.26700091	216.25		25.6	26.028453	0.183572
26.6762822	4.31094766	217.25		24.6	26.007822	1.981963
26.626706	2.98151344	218.25		24.9	25.987463	1.182577
26.5769213	1.38514386	219.25		25.4	25.967383	0.321924

26.5269672	3.71320242	220.25		24.6	25.947587	1.815991
26.4768823	0.76892255	221.25		25.6	25.928081	0.107637
26.4267057	0.85878354	222.25		25.5	25.908872	0.167176
26.3764766	2.1799832	223.25		24.9	25.889965	0.98003
26.326234	0.18167546	224.25		25.9	25.871366	0.00082
26.2760172	0.07618551	225.25		26	25.85308	0.021586
26.2258654	0.27653442	226.25		25.7	25.835113	0.018256
26.1758178	0.60189323	227.25		25.4	25.817471	0.174282
26.1259136	0.85731603	228.25		25.2	25.800159	0.360191
26.0761921	0.07628209	229.25		25.8	25.783183	0.000283
26.0266925	0.0300355	230.25		26.2	25.766546	0.187882
25.9774538	0.33345288	231.25		25.4	25.750255	0.122679
25.9285151	1.76495246	232.25		24.6	25.734315	1.286671
25.8799155	0.33630194	233.25		25.3	25.71873	0.175335
25.8316936	0.1863594	234.25		25.4	25.703505	0.092115
25.7838884	1.40159175	235.25		24.6	25.688645	1.185148
25.7365384	0.19056575	236.25		25.3	25.674154	0.139991
25.689682	0.03597925	237.25		25.5	25.660037	0.025612
25.6433575	0.55258039	238.25		24.9	25.646297	0.556959
25.5976031	0.24760881	239.25		25.1	25.63294	0.284025
25.5524565	0.00226038	240.25		25.6	25.619969	0.000399
25.5079556	0.2421077	241.25		26	25.607388	0.154144
25.4641377	0.40432092	242.25		26.1	25.595201	0.254822
25.4210399	0.46098678	243.25		26.1	25.583412	0.266864
26.8720476	1.61810515	244.25	SEPTEMBER	25.6	25.572024	0.000783
26.8248675	1.50030028	245.25		25.6	25.56104	0.001518
26.7781866	1.3881237	246.25		25.6	25.550465	0.002454
26.7320423	0.28306896	247.25		26.2	25.540301	0.435202
26.6864713	1.6550083	248.25		25.4	25.530552	0.017044
26.6415102	1.30304559	249.25		25.5	25.52122	0.00045
26.5971954	0.08832513	250.25		26.3	25.512308	0.620458
26.5535629	1.33070733	251.25		25.4	25.50382	0.010778
26.5106482	0.65715054	252.25		25.7	25.495756	0.041716
26.4684867	10.6830056	253.25		23.2	25.488121	5.235497
26.4271134	2.33207532	254.25		24.9	25.480916	0.337463
26.3865627	0.7859935	255.25		25.5	25.474143	0.000669
26.346869	0.89656083	256.25		25.4	25.467806	0.004598
26.3080658	0.25813087	257.25		25.8	25.461904	0.114309
26.2701866	0.32511281	258.25		25.7	25.456441	0.059321
26.2332644	2.66755248	259.25		24.6	25.451418	0.724912
26.1973314	0.63573742	260.25		25.4	25.446836	0.002194
26.1624199	0.13134815	261.25		25.8	25.442697	0.127665
26.1285611	0.00081574	262.25		26.1	25.439003	0.436917
26.0957863	0.15664682	263.25		25.7	25.435753	0.069826
26.0641259	1.35518915	264.25		24.9	25.43295	0.284036
26.0336099	0.05457359	265.25		25.8	25.430594	0.136461
26.0042678	0.01087177	266.25		25.9	25.428686	0.222137
25.9761285	1.15805252	267.25		24.9	25.427227	0.277968
25.9492203	0.0227345	268.25		26.1	25.426216	0.453985
25.9235712	0.45755598	269.25		26.6	25.425654	1.379089
25.8992081	0.04031737	270.25		26.1	25.425542	0.454894
25.8761579	0.33195795	271.25		25.3	25.425879	0.015845
25.8544465	0.02118583	272.25		26	25.426665	0.328713
25.8340992	1.06936121	273.25		24.8	25.4279	0.394259
26.8853428	0.3426262	274.25	OCTOBER	26.3	25.429584	0.757623
26.8521687	0.20445656	275.25		26.4	25.431716	0.937573

26.8201941	6.86541723	276.25		24.2	25.434296	1.523487
26.789445	0.47533443	277.25		26.1	25.437322	0.439142
26.7599468	1.12348722	278.25		25.7	25.440795	0.067187
26.7317242	3.35521364	279.25		24.9	25.444711	0.29671
26.7048014	0.64770529	280.25		25.9	25.449072	0.203336
26.6792017	0.22963432	281.25		26.2	25.453874	0.556704
26.6549481	0.91192578	282.25		25.7	25.459118	0.058024
26.6320624	0.53591534	283.25		25.9	25.4648	0.189399
26.6105662	0.01222487	284.25		26.5	25.47092	1.059006
26.59048	0.2596106	285.25		27.1	25.477475	2.632586
26.571824	0.01642908	286.25		26.7	25.484464	1.477527
26.5546174	0.19836569	287.25		27	25.491885	2.274411
26.5388786	0.00151155	288.25		26.5	25.499735	1.000531
26.5246255	3.32925836	289.25		24.7	25.508011	0.652882
26.5118752	0.04489111	290.25		26.3	25.516712	0.613541
26.500644	0.00987162	291.25		26.6	25.525834	1.153833
26.4909473	0.24102924	292.25		26	25.535375	0.215877
26.4828	0.07997583	293.25		26.2	25.545332	0.428591
26.476216	0.76775454	294.25		25.6	25.555702	0.001962
26.4712087	0.68689506	295.25		27.3	25.566481	3.005087
26.4677903	0.39968907	296.25		27.1	25.577667	2.317497
26.4659726	0.18837975	297.25		26.9	25.589256	1.718049
26.4657664	0.28540549	298.25		27	25.601245	1.956516
26.4671818	0.32169517	299.25		25.9	25.613629	0.082008
26.4702279	0.0730231	300.25		26.2	25.626406	0.32901
26.4749131	0.10568148	301.25		26.8	25.63957	1.346597
26.4812451	2.19408713	302.25		25	25.653119	0.426565
26.4892307	0.23934663	303.25		26	25.667048	0.110857
26.4988756	0.09067588	304.25		26.8	25.681353	1.251371
26.9086837	1.22917962	305.25	NOVEMBER	25.8	25.696029	0.01081
26.8992535	0.15940335	306.25		26.5	25.711072	0.622407
26.8914071	1.66773222	307.25		25.6	25.726478	0.015997
26.8851517	0.14834185	308.25		26.5	25.742241	0.574198
26.8804939	3.17015845	309.25		25.1	25.758357	0.433434
26.8774391	0.07697247	310.25		26.6	25.774821	0.68092
26.8759923	0.17978256	311.25		27.3	25.791629	2.275184
26.8761572	0.38917984	312.25		27.5	25.808774	2.860247
26.8779371	0.38696231	313.25		27.5	25.826251	2.801435
26.8813341	0.07914886	314.25		26.6	25.844056	0.571451
26.8863497	0.37656668	315.25		27.5	25.862183	2.682444
26.8929845	0.82267704	316.25		27.8	25.880626	3.683995
26.9012383	0.99752489	317.25		27.9	25.89938	4.002479
26.91111	0.08345745	318.25		27.2	25.918439	1.642398
26.9225975	0.60435459	319.25		27.7	25.937798	3.105357
26.9356983	1.59845885	320.25		28.2	25.957449	5.029034
26.9504086	1.56147874	321.25		28.2	25.977388	4.940004
26.966724	0.28438331	322.25		27.5	25.997608	2.257181
26.9846392	1.03095749	323.25		28	26.018104	3.927913
27.0041482	0.35503937	324.25		27.6	26.038868	2.437134
27.0252439	0.45529574	325.25		27.7	26.059895	2.689946
27.0479187	0.7260426	326.25		27.9	26.081177	3.308115
27.0721638	0.27861108	327.25		27.6	26.10271	2.241877
27.0979698	0.09122222	328.25		27.4	26.124486	1.626937
27.1253266	0.33024952	329.25		27.7	26.146498	2.413369
27.154223	0.8944942	330.25		28.1	26.16874	3.729766
27.1846471	0.66480042	331.25		28	26.191205	3.271741

27.2165862	0.78041999		332.25			28.1	26.213886	3.557427
27.2500268	0.72245443		333.25			28.1	26.236776	3.471604
27.2849546	0.3782808		334.25			27.9	26.259868	2.690032
26.9343438	1.13562316		335.25	DECEMBER		28	26.283156	2.947553
26.9505351	0.4218046		336.25			27.6	26.306632	1.672801
26.9682516	0.01735763		337.25			27.1	26.330289	0.592455
26.9874803	0.5076843		338.25			27.7	26.35412	1.811394
27.0082075	0.04335035		339.25			26.8	26.378117	0.177985
27.0304185	0.22050676		340.25			27.5	26.402273	1.205004
27.0540982	0.02128732		341.25			27.2	26.426581	0.598176
27.0792305	0.27120085		342.25			27.6	26.451034	1.320123
27.1057985	0.98843655		343.25			28.1	26.475624	2.638598
27.1337847	0.93357201		344.25			28.1	26.500343	2.558902
27.1631707	0.70028334		345.25			28	26.525184	2.175082
27.1939373	0.649737		346.25			28	26.55014	2.102095
27.2260649	0.5989755		347.25			28	26.575202	2.030049
27.2595329	0.1940113		348.25			27.7	26.600364	1.2092
27.2943199	0.25571239		349.25			27.8	26.625617	1.379176
27.330404	0.32443962		350.25			27.9	26.650954	1.560116
27.3677625	0.53617171		351.25			28.1	26.676367	2.026731
27.4063721	0.1549429		352.25			27.8	26.701848	1.205937
27.4462087	0.20592651		353.25			27.9	26.72739	1.375014
27.4872476	0.09781406		354.25			27.8	26.752985	1.09624
27.5294634	0.32551206		355.25			28.1	26.778625	1.746032
27.57283	0.13900217		356.25			27.2	26.804302	0.156577
27.6173207	0.38108484		357.25			27	26.830008	0.028897
27.6629083	0.31686571		358.25			27.1	26.855736	0.059665
27.7095647	2.27878565		359.25			26.2	26.881478	0.464412
27.7572615	5.55668188		360.25			25.4	26.907226	2.271729
27.8059695	2.91033197		361.25			26.1	26.932971	0.693841
27.855659	2.42007477		362.25			26.3	26.958707	0.433895
27.9062995	2.2689383		363.25			26.4	26.984425	0.341553
27.9578604	1.58221276		364.25			26.7	27.010118	0.096173
28.0103101	1.71691253		365.25			26.7	27.035777	0.112746
26.9566602	0.02454242	1996	1	JAN.		26.8	26.825172	0.000634
26.9946966	0.0110888		2			27.1	26.850815	0.062093
27.0337694	0.07087872		3			27.3	26.876441	0.179402
27.0738485	0.05114451		4			27.3	26.902044	0.158369
27.1149031	0.0002221		5			27.1	26.927616	0.029716
27.1569022	0.19633563		6			27.6	26.953149	0.418416
27.1998141	0.09011157		7			27.5	26.978635	0.271822
27.2436066	0.30957363		8			27.8	27.004066	0.63351
27.288247	0.09718992		9			27.6	27.029435	0.325544
27.3337023	0.44395259		10			28	27.054735	0.893527
27.3799389	0.27046352		11			27.9	27.079956	0.672472
27.4269228	0.07457113		12			27.7	27.105092	0.353916
27.4746197	0.60003561		13			26.7	27.130135	0.165016
27.5229945	0.5227211		14			26.8	27.155077	0.12608
27.5720123	0.22279559		15			27.1	27.179911	0.006386
27.6216373	0.10345054		16			27.3	27.204629	0.009096
27.6718336	0.13826022		17			27.3	27.229223	0.005009
27.7225649	0.10404812		18			27.4	27.253687	0.021407
27.7737946	0.03020456		19			27.6	27.278012	0.103676
27.8254857	0.00064952		20			27.8	27.302192	0.247813
27.8776009	0.6046632		21			27.1	27.326219	0.051175
27.9301028	0.1849884		22			27.5	27.350085	0.022475

27.9829534	0.14665332	23		27.6	27.373783	0.051174
28.0361148	0.00130428	24		28	27.397306	0.36324
28.0895486	0.15174809	25		27.7	27.420648	0.078038
28.1432162	0.11779738	26		27.8	27.4438	0.126879
28.197079	2.55066141	27		26.6	27.466756	0.751266
28.251098	0.0023914	28		28.3	27.489508	0.656897
28.3052341	0.00898057	29		28.4	27.512051	0.788454
28.3594481	0.00353408	30		28.3	27.534376	0.58618
28.4137005	0.00744761	31		28.5	27.556478	0.890234
26.9684154	3.73101897	32	FEB.	28.9	27.578349	1.746762
27.0174312	2.50452392	33		28.6	27.599983	1.000035
27.0666986	3.36099408	34		28.9	27.621372	1.634888
27.1161788	2.8352538	35		28.8	27.642512	1.339778
27.1658331	1.78000132	36		28.5	27.663395	0.699908
27.2156225	2.83712744	37		28.9	27.684015	1.478621
27.2655081	2.35466529	38		28.8	27.704365	1.200417
27.3154508	0.34169776	39		27.9	27.724439	0.030822
27.3654114	0.13352553	40		27	27.744232	0.553882
27.4153509	0.00023565	41		27.4	27.763737	0.132305
27.4652299	0.74862282	42		26.6	27.782949	1.399368
27.5150094	0.03422153	43		27.7	27.801861	0.010376
27.5646501	0.31882973	44		27	27.820467	0.673166
27.6141129	0.00737659	45		27.7	27.838763	0.019255
27.6633587	0.02668606	46		27.5	27.856742	0.127265
27.7123484	1.23731905	47		26.6	27.874398	1.624091
27.7610432	0.00151763	48		27.8	27.891728	0.008414
27.809404	0.24068442	49		28.3	27.908725	0.153096
27.8573922	0.02033697	50		28	27.925384	0.005568
27.9049692	0.36598772	51		27.3	27.9417	0.411779
27.9520964	0.20061763	52		28.4	27.957668	0.195658
27.9987356	1.00253049	53		29	27.973283	1.054148
28.0448485	1.11334469	54		29.1	27.988541	1.235342
28.0903973	1.23121815	55		29.2	28.003436	1.431765
28.1353442	1.13349194	56		29.2	28.017965	1.397206
28.1796517	0.0144837	57		28.3	28.032123	0.071758
28.2232826	0.38848122	58		27.6	28.045905	0.198831
28.2661998	0.28494262	59		28.8	28.059308	0.548625
28.2768133	0.00590028	59.25		28.2	28.062598	0.018879
26.9670189	2.45554822	60.25	MAR	25.4	28.075521	7.158411
27.0138525	0.47079834	61.25		27.7	28.088054	0.150586
27.0601535	0.40940355	62.25		27.7	28.100195	0.160156
27.1058849	0.64945049	63.25		26.3	28.11194	3.283128
27.1510102	0.20159185	64.25		27.6	28.123285	0.273828
27.195493	0.16362588	65.25		27.6	28.134227	0.285399
27.2392975	3.10007328	66.25		29	28.144763	0.731431
27.2823879	3.30371359	67.25		29.1	28.154888	0.893236
27.3247291	4.73180361	68.25		29.5	28.164601	1.783291
27.366286	3.73924998	69.25		29.3	28.173898	1.268106
27.4070241	0.48021564	70.25		28.1	28.182776	0.006852
27.4469092	3.43394537	71.25		29.3	28.191233	1.229365
27.4859077	2.60529387	72.25		29.1	28.199266	0.811322
27.5239862	0.85375051	73.25		26.6	28.206872	2.582038
27.5611118	0.2904005	74.25		28.1	28.21405	0.013007
27.5972521	0.2527555	75.25		28.1	28.220797	0.014592
27.632375	2.78097309	76.25		29.3	28.227111	1.15109

27.6664492	2.66848826	77.25		29.3	28.23299	1.13851
27.6994436	1.44133574	78.25		28.9	28.238433	0.437671
27.7313277	1.60952946	79.25		29	28.243437	0.572387
27.7620715	0.1310958	80.25		27.4	28.248002	0.719107
27.7916457	0.15338636	81.25		27.4	28.252125	0.726117
27.8200213	0.51843069	82.25		27.1	28.255805	1.335886
27.84717	1.31599902	83.25		26.7	28.259043	2.430614
27.873064	0.10688713	84.25		28.2	28.261835	0.003824
27.8976762	0.01047016	85.25		28	28.264182	0.069792
27.92098	0.46106818	86.25		28.6	28.266083	0.1115
27.9429494	0.02043452	87.25		27.8	28.267537	0.218591
27.963559	1.5965814	88.25		26.7	28.268544	2.460332
27.9827842	0.2330806	89.25		27.5	28.269104	0.591521
28.0006009	0.99879857	90.25		29	28.269216	0.534045
26.9526049	5.51026373	91.25	APRIL	29.3	28.26888	1.063208
26.9843047	5.83558389	92.25		29.4	28.268097	1.281205
27.0147635	5.68935297	93.25		29.4	28.266866	1.283992
27.0439566	0.29588883	94.25		26.5	28.265189	3.11589
27.0718598	1.05707232	95.25		28.1	28.263064	0.02659
27.0984494	0.63752145	96.25		26.3	28.260494	3.843539
27.1237026	1.38367547	97.25		28.3	28.25748	0.001808
27.1475973	4.21235676	98.25		29.2	28.254021	0.894877
27.1701119	4.12044559	99.25		29.2	28.250118	0.902275
27.1912257	4.87868405	100.25		29.4	28.245774	1.332237
27.2109185	0.50540505	101.25		26.5	28.24099	3.031046
27.2291709	0.39585605	102.25		26.6	28.235766	2.675731
27.2459644	1.33179811	103.25		28.4	28.230105	0.028864
27.2612811	1.29668083	104.25		28.4	28.224008	0.030973
27.2751037	1.75535032	105.25		28.6	28.217478	0.146323
27.2874158	0.34505734	106.25		26.7	28.210515	2.281655
27.2982019	1.20604737	107.25		26.2	28.203122	4.012499
27.307447	2.53622516	108.25		28.9	28.195302	0.496599
27.315137	1.03050306	109.25		26.3	28.187057	3.560985
27.3212585	0.27171047	110.25		26.8	28.178389	1.899957
27.3257992	1.62358778	111.25		28.6	28.169301	0.185501
27.3287471	1.27406991	112.25		26.2	28.159796	3.840801
27.3300913	0.00488723	113.25		27.4	28.149877	0.562315
27.3298217	0.32510332	114.25		27.9	28.139546	0.057382
27.3279289	2.16699326	115.25		28.8	28.128807	0.4505
27.3244045	4.73321591	116.25		29.5	28.117663	1.910855
27.3192406	2.62194019	117.25		25.7	28.106118	5.789402
27.3124305	26.1369455	118.25		22.2	28.094174	34.74129
27.303968	32.5352511	119.25		21.6	28.081836	42.0142
27.293848	0.35265541	120.25		26.7	28.069108	1.874457
26.9296379	3.88232688	121.25	MAY	28.9	28.055993	0.712348
26.9380031	0.54464863	122.25		26.2	28.042495	3.394788
26.9447782	2.73975904	123.25		28.6	28.028618	0.326477
26.9499568	3.80266845	124.25		28.9	28.014368	0.784345
26.9535332	2.73417215	125.25		25.3	27.999747	7.288632
26.9555028	1.11408608	126.25		25.9	27.98476	4.346225
26.9558615	1.54788066	127.25		28.2	27.969413	0.053171
26.9546063	1.31192674	128.25		28.1	27.953709	0.021401
26.951735	4.19538965	129.25		29	27.937653	1.128581
26.9472461	0.55837669	130.25		26.2	27.921251	2.962705
26.941139	0.01992023	131.25		26.8	27.904507	1.219936
26.9334141	2.45419126	132.25		28.5	27.887427	0.375246

26.9240725	4.73466062	133.25		29.1	27.870015	1.512864
26.913116	1.40869369	134.25		28.1	27.852277	0.061367
26.9005474	1.00109518	135.25		25.9	27.834218	3.7412
26.8863705	0.37654119	136.25		27.5	27.815844	0.099758
26.8705896	3.34674255	137.25		28.7	27.797161	0.815118
26.85321	2.09320138	138.25		28.3	27.778174	0.272303
26.8342378	4.69052571	139.25		29	27.758888	1.540358
26.8136801	0.01292317	140.25		26.7	27.739311	1.080167
26.7915447	0.37021791	141.25		27.4	27.719447	0.102046
26.76784	0.01746627	142.25		26.9	27.699303	0.638885
26.7425756	0.2943883	143.25		26.2	27.678885	2.1871
26.7157618	0.01340079	144.25		26.6	27.658199	1.119784
26.6874096	0.66030316	145.25		27.5	27.637251	0.018838
26.6575309	0.00180362	146.25		26.7	27.616048	0.839144
26.6261385	0.27682175	147.25		26.1	27.594597	2.233819
26.5932459	0.36815057	148.25		27.2	27.572903	0.139057
26.5588673	0.01991844	149.25		26.7	27.550974	0.724156
26.5230179	0.38815134	150.25		25.9	27.528816	2.65304
26.4857137	1.65305961	151.25		25.2	27.506435	5.319644
26.9031863	1.0152E-05	152.25	JUNE	26.9	27.48384	0.340869
26.8851659	0.03428643	153.25		26.7	27.461036	0.579175
26.8656423	0.3199512	154.25		26.3	27.43803	1.295112
26.8446297	0.42951021	155.25		27.5	27.41483	0.007254
26.8221434	0.77063225	156.25		27.7	27.391442	0.095208
26.7981992	1.0036048	157.25		27.8	27.367875	0.186732
26.7728139	3.50743204	158.25		24.9	27.344134	5.973789
26.746005	0.41732244	159.25		26.1	27.320227	1.488953
26.7177906	0.04743274	160.25		26.5	27.296161	0.633873
26.6881897	7.22636371	161.25		24	27.271945	10.70562
26.6572219	3.44927334	162.25		24.8	27.247584	5.990667
26.6249078	6.37515945	163.25		24.1	27.223087	9.753671
26.5912684	0.24134465	164.25		26.1	27.198461	1.206616
26.5563256	0.73329349	165.25		25.7	27.173713	2.17183
26.5201019	2.95875043	166.25		24.8	27.148851	5.517102
26.4826205	3.54426	167.25		24.6	27.123883	6.369986
26.4439054	0.11827095	168.25		26.1	27.098816	0.997634
26.4039812	0.0092196	169.25		26.5	27.073658	0.329084
26.3628732	0.87820673	170.25		27.3	27.048417	0.063294
26.3206071	0.60745327	171.25		27.1	27.023099	0.005914
26.2772097	0.67698393	172.25		27.1	26.997714	0.010462
26.232708	0.58873702	173.25		27	26.972268	0.000769
26.1871299	0.23729554	174.25		25.7	26.94677	1.554435
26.1405038	0.92063295	175.25		27.1	26.921226	0.03196
26.0928587	1.45719007	176.25		27.3	26.895646	0.163502
26.0442242	0.19733518	177.25		25.6	26.870036	1.612992
25.9946306	0.24465938	178.25		25.5	26.844405	1.807425
25.9441084	0.02076723	179.25		25.8	26.81876	1.037873
25.892689	0.25736442	180.25		26.4	26.79311	0.154535
25.8404043	0.00355165	181.25		25.9	26.767461	0.752489
26.8820065	5.67395483	182.25	JULY	24.5	26.741822	5.025766
26.8432839	5.96963643	183.25		24.4	26.716201	5.364786
26.8035523	4.85564257	184.25		24.6	26.690605	4.370628
26.7628421	0.74449646	185.25		25.9	26.665042	0.585289
26.7211846	1.25705485	186.25		25.6	26.63952	1.080602
26.6786114	1.63484715	187.25		25.4	26.614047	1.47391
26.6351548	1.28857635	188.25		25.5	26.58863	1.185116

26.5908473	0.34910051	189.25		26	26.563278	0.317282
26.5457221	6.48070078	190.25		24	26.537998	6.441432
26.4998126	0.48973774	191.25		25.8	26.512797	0.508079
26.453153	8.1404823	192.25		23.6	26.487683	8.338716
26.4057777	3.26083296	193.25		24.6	26.462665	3.469521
26.3577213	3.83267273	194.25		24.4	26.437749	4.152422
26.3090192	0.09549287	195.25		26	26.412944	0.170522
26.2597069	1.84880291	196.25		24.9	26.388256	2.214905
26.2098204	0.50384502	197.25		25.5	26.363693	0.745966
26.159396	1.8479574	198.25		24.8	26.339263	2.369332
26.1084702	0.25854196	199.25		25.6	26.314974	0.511187
26.0570801	1.33883433	200.25		24.9	26.290832	1.934413
26.0052628	1.01055337	201.25		25	26.266845	1.604895
25.953056	0.06403733	202.25		25.7	26.24302	0.294871
25.9004973	0.25049756	203.25		25.4	26.219365	0.671358
25.8476249	0.06131809	204.25		25.6	26.195886	0.35508
25.794477	0.1556121	205.25		25.4	26.172591	0.596897
25.7410921	0.11634385	206.25		25.4	26.149488	0.561732
25.687509	0.01265422	207.25		25.8	26.126582	0.106656
25.6337666	0.0178935	208.25		25.5	26.103881	0.364672
25.5799038	0.00638462	209.25		25.5	26.081392	0.338017
25.5259601	0.10624996	210.25		25.2	26.059122	0.738091
25.4719746	0.05199557	211.25		25.7	26.037078	0.113621
25.417987	0.07953133	212.25		25.7	26.015265	0.099392
26.8707725	3.4997897	213.25	AUGUST	25	25.993692	0.987424
26.8215998	3.31822599	214.25		25	25.972364	0.945492
26.7722105	10.0629193	215.25		23.6	25.951288	5.528555
26.7226432	20.4543013	216.25		22.2	25.93047	13.91641
26.6729369	6.62000406	217.25		24.1	25.909917	3.275801
26.6231305	4.09305707	218.25		24.6	25.889636	1.66316
26.5732632	0.94724127	219.25		25.6	25.869631	0.072701
26.5233741	1.04729447	220.25		25.5	25.849909	0.122437
26.4735022	0.94770658	221.25		25.5	25.830477	0.109215
26.4236869	0.85319744	222.25		25.5	25.81134	0.096933
26.3739672	0.59902519	223.25		25.6	25.792504	0.037058
26.3243823	1.49911203	224.25		25.1	25.773975	0.454242
26.2749714	2.80552916	225.25		24.6	25.755758	1.335776
26.2257735	0.68190191	226.25		25.4	25.737859	0.114149
26.1768277	3.15711672	227.25		24.4	25.720283	1.743148
26.1281729	1.76404329	228.25		24.8	25.703037	0.815475
26.079848	1.16607162	229.25		25	25.686124	0.470766
26.0318916	0.86842195	230.25		25.1	25.66955	0.324387
25.9843424	1.40266696	231.25		24.8	25.653321	0.728156
25.9372389	3.37544668	232.25		24.1	25.63744	2.363722
25.8906193	0.08445955	233.25		25.6	25.621914	0.00048
25.8445217	0.19759953	234.25		25.4	25.606746	0.042744
25.7989841	0.48857872	235.25		25.1	25.591942	0.242007
25.7540441	2.11424426	236.25		24.3	25.577506	1.63202
25.7097393	0.09593842	237.25		25.4	25.563441	0.026713
25.6661068	0.00437011	238.25		25.6	25.549754	0.002525
25.6231836	0.01517421	239.25		25.5	25.536447	0.001328
25.5810065	0.00656206	240.25		25.5	25.523524	0.000553
25.5396118	0.11533617	241.25		25.2	25.510991	0.096715
25.4990356	0.48865073	242.25		24.8	25.49885	0.488391
25.4593136	0.31283172	243.25		24.9	25.487105	0.344692
26.8735125	2.47594148	244.25	SEPTEMBER	25.3	25.47576	0.030891

26.8279366	5.89487627	245.25		24.4	25.464818	1.133837
26.7829984	3.54568296	246.25		24.9	25.454282	0.307229
26.7387336	2.68544795	247.25		25.1	25.444157	0.118444
26.6951779	2.23555692	248.25		25.2	25.434444	0.054964
26.6523663	2.10936791	249.25		25.2	25.425147	0.050691
26.6103337	1.46490771	250.25		25.4	25.416269	0.000265
26.5691145	1.14300585	251.25		25.5	25.407812	0.008499
26.5287427	0.27956887	252.25		26	25.399779	0.360265
26.4892519	0.97861942	253.25		25.5	25.392173	0.011627
26.4506754	8.70648506	254.25		23.5	25.384995	3.553206
26.4130457	7.36061687	255.25		23.7	25.378248	2.816516
26.3763952	3.15557987	256.25		24.6	25.371934	0.595882
26.3407557	1.53947467	257.25		25.1	25.366055	0.070785
26.3061585	1.22358657	258.25		25.2	25.360612	0.025796
26.2726344	1.37507138	259.25		25.1	25.355608	0.065335
26.2402137	0.88400178	260.25		25.3	25.351044	0.002605
26.2089262	1.46150253	261.25		25	25.34692	0.120354
26.1788011	0.77229138	262.25		25.3	25.34324	0.00187
26.1498671	2.40208811	263.25		24.6	25.340002	0.547604
26.1221524	3.69466971	264.25		24.2	25.33721	1.293246
26.0956844	0.80225048	265.25		25.2	25.334863	0.018188
26.0704901	0.13726289	266.25		25.7	25.332962	0.134717
26.0465958	1.09536283	267.25		25	25.331508	0.109897
26.0240274	0.52421565	268.25		25.3	25.330501	0.00093
26.0028098	0.25281773	269.25		25.5	25.329941	0.02892
25.9829677	0.03347716	270.25		25.8	25.329829	0.221061
25.9645247	0.93030783	271.25		25	25.330165	0.109009
25.947504	0.29976067	272.25		25.4	25.330948	0.004768
25.9319283	0.00463376	273.25		26	25.332179	0.445985
26.8887621	1.18540283	274.25	OCTOBER	25.8	25.333857	0.21729
26.8591037	2.12898351	275.25		25.4	25.335981	0.004098
26.8307384	5.43234164	276.25		24.5	25.338551	0.703167
26.8036896	2.26108242	277.25		25.3	25.341566	0.001728
26.7779797	1.89882815	278.25		25.4	25.345025	0.003022
26.7536307	1.83231609	279.25		25.4	25.348927	0.002608
26.7306637	5.90812599	280.25		24.3	25.353271	1.109379
26.7090992	1.46192079	281.25		25.5	25.358055	0.020148
26.6889569	0.97803571	282.25		25.7	25.363279	0.113381
26.6702559	0.59329409	283.25		25.9	25.36894	0.282025
26.6530144	0.12461918	284.25		26.3	25.375037	0.855557
26.6372501	0.87843777	285.25		25.7	25.381567	0.101399
26.6229797	11.0421943	286.25		23.3	25.38853	4.361958
26.6102194	1.71667478	287.25		25.3	25.395923	0.009201
26.5989843	0.01020418	288.25		26.7	25.403743	1.680283
26.589289	0.34726153	289.25		26	25.411988	0.345758
26.5811473	4.75740344	290.25		24.4	25.420656	1.041738
26.5745721	0.33013306	291.25		26	25.429744	0.325192
26.5695755	0.00484076	292.25		26.5	25.439249	1.125193
26.5661691	0.00114453	293.25		26.6	25.449168	1.324414
26.5643633	0.01839733	294.25		26.7	25.459499	1.538842
26.5641678	0.02695108	295.25		26.4	25.470238	0.864457
26.5655918	0.01806557	296.25		26.7	25.481382	1.48503
26.5686432	0.05352596	297.25		26.8	25.492927	1.708439
26.5733295	0.13937491	298.25		26.2	25.504871	0.483204
26.5796571	0.1441395	299.25		26.2	25.517209	0.466204
26.5876317	0.09757398	300.25		26.9	25.529937	1.877072

26.5972581	0.16220107	301.25		27	25.543052	2.122697
26.6085403	0.34982457	302.25		27.2	25.55655	2.700928
26.6214815	1.16320207	303.25		27.7	25.570427	4.535083
26.6360841	0.92913388	304.25		27.6	25.584677	4.061525
26.9131559	2.51807409	305.25	NOVEMBER	28.5	25.599298	8.41407
26.9082229	2.5337544	306.25		28.5	25.614285	8.327351
26.9048951	0.63219181	307.25		27.7	25.629633	4.286422
26.9031763	0.99365753	308.25		27.9	25.645336	5.083508
26.9030693	1.43264308	309.25		28.1	25.661392	5.946809
26.9045762	0.632699	310.25		27.7	25.677794	4.089317
26.9076982	1.93850435	311.25		28.3	25.694538	6.788432
26.9124356	0.97528349	312.25		27.9	25.711618	4.789014
26.9187879	1.16901958	313.25		28	25.72903	5.157303
26.9267539	0.59790958	314.25		27.7	25.746768	3.815114
26.9363313	1.35412488	315.25		28.1	25.764827	5.453033
26.9475172	1.10772013	316.25		28	25.783201	4.914199
26.9603077	0.40920629	317.25		27.6	25.801884	3.233221
26.9746981	1.26630433	318.25		28.1	25.820871	5.194427
26.990683	1.46244755	319.25		28.2	25.840157	5.56886
27.008256	6.8162E-05	320.25		27	25.859734	1.300206
27.02741	0.01623331	321.25		26.9	25.879598	1.04122
27.0481369	0.20418028	322.25		27.5	25.899742	2.560825
27.0704279	0.8641043	323.25		28	25.92016	4.325733
27.0942734	1.01148603	324.25		28.1	25.940846	4.661944
27.1196629	0.23072376	325.25		27.6	25.961794	2.683719
27.1465851	0.20558508	326.25		27.6	25.982997	2.614699
27.1750279	0.68057889	327.25		28	26.004448	3.982226
27.2049785	0.24504625	328.25		27.7	26.026142	2.8018
27.2364232	0.21490349	329.25		27.7	26.048071	2.728868
27.2693473	2.15898156	330.25		25.8	26.070229	0.073024
27.3037357	2.57196829	331.25		25.7	26.09261	0.154142
27.3395723	0.88279611	332.25		26.4	26.115205	0.081108
27.3768402	1.89568889	333.25		26	26.13801	0.019047
27.4155217	1.73059745	334.25		26.1	26.161015	0.003723
26.9386189	0.06832008	335.25	DECEMBER	27.2	26.184215	1.031819
26.9590342	0.21071239	336.25		26.5	26.207603	0.085496
26.9809201	0.00654806	337.25		26.9	26.231171	0.447333
27.0042603	0.03831402	338.25		27.2	26.254912	0.893192
27.0290379	0.07342048	339.25		27.3	26.278818	1.042812
27.0552349	0.11886296	340.25		27.4	26.302884	1.203664
27.082833	0.38089516	341.25		27.7	26.327101	1.884853
27.1118127	0.15068936	342.25		27.5	26.351461	1.319141
27.1421542	0.12805361	343.25		27.5	26.375958	1.26347
27.1738367	0.05114984	344.25		27.4	26.400585	0.998831
27.2068388	0.03731126	345.25		27.4	26.425332	0.949977
27.2411383	0.12878175	346.25		27.6	26.450194	1.322054
27.2767123	0.27382997	347.25		27.8	26.475162	1.755196
27.3135375	0.03476826	348.25		27.5	26.500229	0.999543
27.3515896	0.00266148	349.25		27.3	26.525387	0.600026
27.3908436	0.01191511	350.25		27.5	26.550628	0.901307
27.4312742	0.07221355	351.25		27.7	26.575946	1.263498
27.4728551	0.00073684	352.25		27.5	26.601331	0.807606
27.5155596	0.01335402	353.25		27.4	26.626777	0.597874
27.5593602	0.21101175	354.25		27.1	26.652275	0.200457
27.6042288	1.7883E-05	355.25		27.6	26.677819	0.850418
27.6501369	0.00248633	356.25		27.7	26.703399	0.993213

27.6970552	8.6719E-06	357.25		27.7	26.729009	0.942824
27.7449539	0.00303007	358.25		27.8	26.75464	1.092778
27.7938026	0.03755946	359.25		27.6	26.780285	0.671933
27.8435704	0.29546883	360.25		27.3	26.805935	0.2441
27.8942259	0.0377237	361.25		27.7	26.831584	0.754146
27.945737	0.06038667	362.25		27.7	26.857223	0.710273
27.9980712	0.08884643	363.25		27.7	26.882844	0.667743
28.0511955	0.20357736	364.25		27.6	26.90844	0.478255
28.1050764	0.25510213	365.25		27.6	26.934003	0.443552
19711.1463	1.16698118			19646.4	19657.052	1.186686
	1.16698118		Std. Dev.			1.186686
	0.00159424		Std. Error			0.001621

APPENDIX 2

The Results of Forecasted Daily Mean Temperature at Ibadan from 1995 to 1996

Actual	ANPTSM	dev^2			Actual	MNTTTSM	dev^2
27.2	27.07057	0.016753	1	JAN.1995	27.2	26.4837	0.513109
26.5	27.06243	0.316329	2		26.5	26.5118	0.000138
27.3	27.09236	0.043114	3		27.3	26.5398	0.577851
27.1	27.10184	3.37E-06	4		27.1	26.5679	0.283155
26.8	27.11429	0.098781	5		26.8	26.5959	0.041663
27.8	27.10313	0.485621	6		27.8	26.6238	1.383333
28.1	27.08904	1.022046	7		28.1	26.6518	2.097395
28.5	27.07496	2.030748	8		28.5	26.6796	3.313801
28.1	27.04333	1.116545	9		28.1	26.7074	1.939334
27.6	27.02933	0.325669	10		27.6	26.7351	0.748037
27.1	27.04452	0.003079	11		27.1	26.7627	0.113749
26	27.08037	1.167194	12		26	26.7903	0.624514
25.5	27.08393	2.508836	13		25.5	26.8177	1.736308
26	27.07863	1.163451	14		26	26.8450	0.714038
27.2	27.07628	0.015306	15		27.2	26.8722	0.107448
27.3	27.08871	0.044644	16		27.3	26.8993	0.160577
27.1	27.06566	0.001179	17		27.1	26.9262	0.030201
27	27.06329	0.004006	18		27	26.9530	0.002208
27.4	27.08457	0.099496	19		27.4	26.9797	0.176693
26.6	27.10001	0.250006	20		26.6	27.0061	0.164945
26.5	27.07387	0.329332	21		26.5	27.0324	0.283502
27.2	27.08631	0.012926	22		27.2	27.0586	0.019997
27.7	27.075	0.390619	23		27.7	27.0845	0.378787
26.8	27.10234	0.091408	24		26.8	27.1103	0.09629
27.2	27.10888	0.008303	25		27.2	27.1359	0.004112
26.8	27.08261	0.079867	26		26.8	27.1612	0.130486
27.7	27.10702	0.351622	27		27.7	27.1864	0.263815
27.9	27.12256	0.60441	28		27.9	27.2113	0.474321
27	27.12312	0.015159	29		27	27.2360	0.055686
27.8	27.15683	0.41367	30		27.8	27.2604	0.291134
28.3	27.13024	1.368344	31		28.3	27.2846	1.03096
28.3	27.13379	1.360035	32	FEB.	28.3	27.3086	0.98289
29.4	27.11027	5.242885	33		29.4	27.3323	4.275441
28.5	27.11078	1.929924	34		28.5	27.3557	1.309393
28.6	27.12634	2.171668	35		28.6	27.3789	1.491168
27.8	27.14801	0.425097	36		27.8	27.4017	0.158613
27.8	27.12434	0.456512	37		27.8	27.4243	0.141135
28.3	27.15206	1.317756	38		28.3	27.4466	0.728275
29	27.16168	3.379426	39		29	27.4686	2.345198
28.2	27.14396	1.115212	40		28.2	27.4903	0.503711
29.1	27.14748	3.812334	41		29.1	27.5116	2.522898
29.4	27.12372	5.181432	42		29.4	27.5327	3.486892
28.8	27.16363	2.6777	43		28.8	27.5534	1.554035
28.9	27.1702	2.992218	44		28.9	27.5738	1.758888
28.1	27.15238	0.897992	45		28.1	27.5938	0.256231
29.4	27.1437	5.090907	46		29.4	27.6135	3.191587
29.6	27.17155	5.897348	47		29.6	27.6328	3.86973
29	27.18423	3.297026	48		29	27.6518	1.817597

28.7	27.17853	2.314862	49		28.7	27.6704	1.060009
29.6	27.18201	5.846653	50		29.6	27.6887	3.653151
30	27.20085	7.835246	51		30	27.7065	5.259922
29.8	27.17669	6.881735	52		29.8	27.7240	4.309623
29.9	27.16484	7.481127	53		29.9	27.7411	4.660679
30.5	27.14993	11.22296	54		30.5	27.7579	7.519385
29.7	27.14724	6.516598	55		29.7	27.7742	3.708843
29.3	27.11715	4.764834	56		29.3	27.7901	2.279867
28.8	26.34108	6.046291	57		28.8	27.8056	0.988865
28.7	27.07822	2.630156	58		28.7	27.8207	0.773207
27.7	27.14832	0.304346	59		27.7	27.8354	0.018321
	27.16393		59.25			27.8390	
26.4	27.13978	0.547272	60.25	MAR	26.4	27.8531	2.111541
28.7	27.15535	2.385943	61.25		28.7	27.8668	0.694153
29.2	27.1099	4.368522	62.25		29.2	27.8801	1.742034
28.4	27.12232	1.632463	63.25		28.4	27.8930	0.257047
28.9	27.11649	3.180916	64.25		28.9	27.9054	0.989174
27.4	27.07732	0.104123	65.25		27.4	27.9174	0.267715
27.8	27.08359	0.51325	66.25		27.8	27.9290	0.016628
27.6	27.09895	0.251056	67.25		27.6	27.9400	0.115627
26.3	27.15098	0.724171	68.25		26.3	27.9507	2.724738
26.5	27.15119	0.424048	69.25		26.5	27.9609	2.134113
27	27.14526	0.0211	70.25		27	27.9706	0.942034
28.7	27.09363	2.580411	71.25		28.7	27.9798	0.518621
28.7	27.14562	2.416111	72.25		28.7	27.9886	0.506027
28.5	27.10914	1.934486	73.25		28.5	27.9970	0.253034
26.8	26.98592	0.034567	74.25		26.8	28.0048	1.451632
28.5	27.09726	1.967686	75.25		28.5	28.0122	0.237923
27.3	27.12478	0.0307	76.25		27.3	28.0191	0.517165
23.2	26.99815	14.42596	77.25		23.2	28.0256	23.28623
26.9	27.09455	0.03785	78.25		26.9	28.0315	1.280387
27.8	27.07948	0.519155	79.25		27.8	28.0370	0.05618
23.6	27.0735	12.06519	80.25		23.6	28.0420	19.73156
26.8	27.11914	0.101849	81.25		26.8	28.0465	1.553856
26.3	27.14366	0.711761	82.25		26.3	28.0506	3.064492
26.1	27.14984	1.102164	83.25		26.1	28.0541	3.818563
27.6	27.09492	0.255104	84.25		27.6	28.0572	0.209007
28.4	27.14071	1.585821	85.25		28.4	28.0597	0.115774
28.6	27.16528	2.05842	86.25		28.6	28.0618	0.289632
26.8	27.14072	0.116092	87.25		26.8	28.0634	1.596226
28.3	27.13459	1.358177	88.25		28.3	28.0645	0.05545
29.1	27.11015	3.959517	89.25		29.1	28.0651	1.070947
28.3	27.11926	1.39414	90.25		28.3	28.0653	0.055104
28.1	27.15289	0.897025	91.25	APRIL	28.1	28.0649	0.001233
27.3	27.12833	0.029471	92.25		27.3	28.0640	0.583743
27.6	27.1497	0.202773	93.25		27.6	28.0627	0.214076
28.7	27.15576	2.384685	94.25		28.7	28.0608	0.408518
27.9	27.15567	0.55403	95.25		27.9	28.0585	0.025128
28.6	27.16171	2.068675	96.25		28.6	28.0557	0.296257
28.8	27.1616	2.684361	97.25		28.8	28.0524	0.558902
28.8	27.13083	2.786123	98.25		28.8	28.0486	0.564581
29	27.17056	3.346844	99.25		29	28.0443	0.913285
29	27.17349	3.336136	100.25		29	28.0396	0.922402
28	27.17025	0.68848	101.25		28	28.0343	0.001179
29.3	27.11804	4.760953	102.25		29.3	28.0286	1.616404
29.4	27.03923	5.573244	103.25		29.4	28.0224	1.897724

29.3	27.10551	4.815769	104.25		29.3	28.0157	1.649315
27.6	27.16336	0.190659	105.25		27.6	28.0086	0.166946
25	27.12338	4.508731	106.25		25	28.0010	9.005791
27.2	27.08672	0.012833	107.25		27.2	27.9929	0.62864
29.1	27.02632	4.300159	108.25		29.1	27.9843	1.244778
27.8	27.10749	0.479569	109.25		27.8	27.9753	0.030721
26.6	27.03487	0.189109	110.25		26.6	27.9658	1.865354
24.6	27.03463	5.927446	111.25		24.6	27.9558	11.26157
27.3	27.09764	0.040951	112.25		27.3	27.9454	0.416562
24.9	27.10342	4.85508	113.25		24.9	27.9346	9.208504
24.9	27.13353	4.988664	114.25		24.9	27.9232	9.139962
27	27.09982	0.009964	115.25		27	27.9115	0.830787
27.2	27.05131	0.022109	116.25		27.2	27.8993	0.488979
28.2	27.09921	1.211738	117.25		28.2	27.8866	0.098204
27.1	27.12314	0.000535	118.25		27.1	27.8735	0.59837
25.5	26.99971	2.249128	119.25		25.5	27.8600	5.569747
27.1	27.0741	0.000671	120.25		27.1	27.8461	0.556651
27.9	27.07376	0.682669	121.25	MAY	27.9	27.8317	0.004661
23.8	27.07943	10.75467	122.25		23.8	27.8169	16.13583
26.3	27.12438	0.67961	123.25		26.3	27.8017	2.255238
26.3	27.11491	0.664077	124.25		26.3	27.7861	2.208603
26.5	27.05734	0.310623	125.25		26.5	27.7701	1.613213
28	27.11714	0.779438	126.25		28	27.7537	0.060659
27.7	27.10767	0.35086	127.25		27.7	27.7369	0.001362
25.8	27.07716	1.631127	128.25		25.8	27.7197	3.685251
27.8	27.09779	0.493105	129.25		27.8	27.7021	0.009581
27.5	27.10037	0.159705	130.25		27.5	27.6842	0.033912
26.5	27.0789	0.33513	131.25		26.5	27.6658	1.35912
27.2	27.09648	0.010716	132.25		27.2	27.6471	0.199904
27.3	27.11711	0.03345	133.25		27.3	27.6280	0.107608
26.6	27.10459	0.25461	134.25		26.6	27.6086	1.017291
27.2	27.11917	0.006533	135.25		27.2	27.5888	0.151189
27.9	27.09763	0.643794	136.25		27.9	27.5687	0.109755
27.5	27.13327	0.13449	137.25		27.5	27.5482	0.002327
28	27.11769	0.778472	138.25		28	27.5274	0.223305
27.3	27.12019	0.032332	139.25		27.3	27.5063	0.04257
28.5	27.0658	2.056938	140.25		28.5	27.4849	1.030461
28	27.01791	0.964509	141.25		28	27.4631	0.288232
28.1	27.06183	1.07779	142.25		28.1	27.4411	0.434195
26.3	27.07025	0.593285	143.25		26.3	27.4187	1.251496
24.7	27.04304	5.489838	144.25		24.7	27.3960	7.268667
26.2	27.10201	0.813618	145.25		26.2	27.3731	1.376173
26.5	27.03907	0.290601	146.25		26.5	27.3499	0.722299
25.6	27.03561	2.060983	147.25		25.6	27.3264	2.980413
27.6	27.06762	0.283429	148.25		27.6	27.3026	0.08843
25.5	27.07598	2.483703	149.25		25.5	27.2786	3.163452
25.4	27.12611	2.979446	150.25		25.4	27.2543	3.438581
26.5	26.94316	0.196387	151.25		26.5	27.2298	0.532651
26.8	27.0536	0.064314	152.25	JUNE	26.8	27.2051	0.164091
28.5	27.10343	1.950419	153.25		28.5	27.1801	1.742121
22.3	27.08797	22.9247	154.25		22.3	27.1549	23.57014
26.1	27.12309	1.046715	155.25		26.1	27.1295	1.059869
27.8	27.00158	0.637475	156.25		27.8	27.1039	0.484577
27.3	27.03611	0.069639	157.25		27.3	27.0781	0.049252
28.5	27.05904	2.076369	158.25		28.5	27.0521	2.096501
24.4	27.11762	7.385462	159.25		24.4	27.0259	6.895279

25.6	27.11699	2.301258	160.25		25.6	26.9995	1.958681
26.4	27.00178	0.362139	161.25		26.4	26.9730	0.328336
28.4	27.06549	1.780906	162.25		28.4	26.9463	2.113171
28.4	27.09731	1.697008	163.25		28.4	26.9195	2.191895
24.5	27.04085	6.455944	164.25		24.5	26.8925	5.724168
26.7	27.07836	0.143158	165.25		26.7	26.8654	0.027363
27.8	27.06306	0.543075	166.25		27.8	26.8382	0.92508
25.9	27.04199	1.304144	167.25		25.9	26.8108	0.829635
27.2	27.04431	0.02424	168.25		27.2	26.7834	0.173565
26.7	27.07879	0.143485	169.25		26.7	26.7558	0.003118
26	27.08403	1.17512	170.25		26	26.7282	0.53026
26.1	27.0746	0.949843	171.25		26.1	26.7005	0.360553
27.3	26.98983	0.096206	172.25		27.3	26.6727	0.393558
27.5	27.02098	0.229459	173.25		27.5	26.6448	0.731387
27.2	27.02907	0.029218	174.25		27.2	26.6169	0.34005
24.3	26.98812	7.226006	175.25		24.3	26.5889	5.238997
25.4	27.03076	2.659366	176.25		25.4	26.5609	1.347617
25.7	27.05043	1.823657	177.25		25.7	26.5328	0.69359
24.3	27.00362	7.309565	178.25		24.3	26.5047	4.860914
25.8	26.9973	1.433524	179.25		25.8	26.4767	0.45787
26.5	27.04857	0.300926	180.25		26.5	26.4486	0.002645
24.9	26.94489	4.181565	181.25		24.9	26.4205	2.311846
24.7	26.96136	5.11375	182.25	JULY	24.7	26.3924	2.864201
26.5	27.01791	0.268227	183.25		26.5	26.3643	0.018405
22.9	26.983	16.67088	184.25		22.9	26.3363	11.80816
23.5	26.98813	12.16705	185.25		23.5	26.3083	7.886562
25.5	26.98471	2.204376	186.25		25.5	26.2803	0.608946
24.3	26.99269	7.250568	187.25		24.3	26.2525	3.812063
24.5	27.00923	6.29623	188.25		24.5	26.2246	2.974291
24.4	26.97168	6.613528	189.25		24.4	26.1968	3.228657
24.7	27.01377	5.353553	190.25		24.7	26.1692	2.158426
25.3	27.02176	2.964461	191.25		25.3	26.1416	0.708219
24	27.00976	9.058663	192.25		24	26.1141	4.469217
25.5	27.00349	2.260494	193.25		25.5	26.0867	0.34416
25.8	26.9859	1.40637	194.25		25.8	26.0594	0.067269
25.4	26.97687	2.486524	195.25		25.4	26.0322	0.39967
25.2	26.99329	3.215901	196.25		25.2	26.0052	0.648275
24.6	26.98143	5.671225	197.25		24.6	25.9783	1.899582
24.3	26.97807	7.172073	198.25		24.3	25.9515	2.727442
24.9	26.94385	4.177331	199.25		24.9	25.9249	1.050407
24.5	26.98264	6.163506	200.25		24.5	25.8985	1.95567
24.4	26.99057	6.711038	201.25		24.4	25.8722	2.167317
23.2	26.9844	14.32167	202.25		23.2	25.8461	7.001777
24.6	26.97544	5.642704	203.25		24.6	25.8202	1.488837
24.9	26.96371	4.258894	204.25		24.9	25.7945	0.800066
24.7	26.98003	5.198519	205.25		24.7	25.7690	1.142656
24.4	26.98794	6.69745	206.25		24.4	25.7436	1.805387
24	27.0015	9.009009	207.25		24	25.7186	2.953447
24.6	26.97851	5.65732	208.25		24.6	25.6937	1.196173
24.9	26.98082	4.329806	209.25		24.9	25.6691	0.591463
25.4	26.99716	2.550917	210.25		25.4	25.6447	0.059866
24.6	26.99947	5.757462	211.25		24.6	25.6205	1.041484
24.7	26.99898	5.285298	212.25		24.7	25.5966	0.803966
25.3	26.94271	2.698481	213.25	AUGUST	25.3	25.5730	0.074536
25.4	26.94503	2.387124	214.25		25.4	25.5497	0.022396
25.4	26.98354	2.507604	215.25		25.4	25.5266	0.01602

23.4	26.98029	12.81848	216.25		23.4	25.5038	4.425851
23.5	26.92165	11.7077	217.25		23.5	25.4813	3.925393
24.9	26.94054	4.163817	218.25		24.9	25.4590	0.312533
24.8	26.97617	4.735721	219.25		24.8	25.4371	0.405943
22.7	26.9674	18.21073	220.25		22.7	25.4155	7.374142
23.4	26.99203	12.90269	221.25		23.4	25.3943	3.97705
24.7	26.98046	5.200513	222.25		24.7	25.3733	0.453325
24.4	26.96617	6.585233	223.25		24.4	25.3527	0.90757
25.3	26.96855	2.784044	224.25		25.3	25.3324	0.001048
24.9	26.98759	4.358031	225.25		24.9	25.3124	0.170089
24.4	26.9872	6.693582	226.25		24.4	25.2928	0.797119
24.5	26.97571	6.129119	227.25		24.5	25.2736	0.598404
25.2	26.97811	3.161659	228.25		25.2	25.2547	0.002989
25.2	26.96667	3.121116	229.25		25.2	25.2362	0.001307
24.8	27.01354	4.899744	230.25		24.8	25.2180	0.174724
24.9	26.9798	4.325576	231.25		24.9	25.2002	0.090135
24.5	26.96564	6.079362	232.25		24.5	25.1828	0.46626
26.2	26.99021	0.624431	233.25		26.2	25.1658	1.069513
25	26.96223	3.850358	234.25		25	25.1492	0.022265
24.5	26.97572	6.129184	235.25		24.5	25.1330	0.40069
25.4	26.98371	2.508126	236.25		25.4	25.1172	0.079982
24.4	26.98894	6.702614	237.25		24.4	25.1018	0.492504
24.9	26.99973	4.408882	238.25		24.9	25.0868	0.034892
25.2	26.99667	3.228024	239.25		25.2	25.0722	0.016328
25.4	27.00471	2.575104	240.25		25.4	25.0581	0.116918
25.8	26.963	1.352568	241.25		25.8	25.0443	0.571022
25.7	26.96275	1.59454	242.25		25.7	25.0310	0.447504
26	26.99561	0.991239	243.25		26	25.0182	0.963972
24.5	27.00923	6.296227	244.25	SEPTEMBER	24.5	25.0058	0.255787
24.5	26.99514	6.225711	245.25		24.5	24.9938	0.243809
25.7	27.00322	1.698387	246.25		25.7	24.9822	0.515192
26.2	26.99747	0.63596	247.25		26.2	24.9711	1.510094
25.7	26.97795	1.633153	248.25		25.7	24.9605	0.546855
26	26.96676	0.93463	249.25		26	24.9503	1.101826
25.8	26.98861	1.41279	250.25		25.8	24.9406	0.738573
25.1	26.99672	3.597558	251.25		25.1	24.9313	0.028448
24.7	26.96353	5.123549	252.25		24.7	24.9225	0.049523
25.5	26.96064	2.133471	253.25		25.5	24.9142	0.343155
25.8	26.98523	1.404782	254.25		25.8	24.9063	0.79862
24.6	26.96587	5.597318	255.25		24.6	24.8990	0.089374
24.5	26.92209	5.866542	256.25		24.5	24.8920	0.153695
25.4	26.96565	2.451247	257.25		25.4	24.8856	0.264607
24.7	27.0041	5.308886	258.25		24.7	24.8796	0.03227
23.1	27.00678	15.26292	259.25		23.1	24.8742	3.147639
24.7	26.99565	5.269996	260.25		24.7	24.8692	0.028615
26.1	26.95165	0.725303	261.25		26.1	24.8646	1.526105
26.2	26.99001	0.624114	262.25		26.2	24.8606	1.793959
25.8	26.98446	1.402935	263.25		25.8	24.8571	0.889123
24.2	26.98993	7.783705	264.25		24.2	24.8540	0.427727
25.6	26.99818	1.954907	265.25		25.6	24.8514	0.560345
25.4	27.01753	2.616415	266.25		25.4	24.8494	0.303209
25.6	26.99265	1.939462	267.25		25.6	24.8478	0.56586
25.9	26.98791	1.140428	268.25		25.9	24.8467	1.109525
26.6	26.99267	0.154192	269.25		26.6	24.8460	3.07635
25.7	27.00651	1.70697	270.25		25.7	24.8459	0.729444
24.8	26.9543	4.641027	271.25		24.8	24.8463	0.002143

25.7	26.98728	1.65709	272.25		25.7	24.8472	0.727352
26.2	26.98184	0.611266	273.25		26.2	24.8485	1.826557
24.3	27.00951	7.341424	274.25	OCTOBER	24.3	24.8503	0.302869
25.5	26.97649	2.180014	275.25		25.5	24.8527	0.419046
25.3	26.98759	2.847947	276.25		25.3	24.8555	0.197601
26.3	26.98218	0.46537	277.25		26.3	24.8588	2.077118
25.1	26.9713	3.501745	278.25		25.1	24.8626	0.056374
25.5	26.97691	2.181269	279.25		25.5	24.8668	0.40089
25.3	26.96331	2.766611	280.25		25.3	24.8716	0.183528
24.9	27.00201	4.418465	281.25		24.9	24.8768	0.000536
25.1	27.00217	3.618258	282.25		25.1	24.8826	0.04728
24.6	26.98852	5.70504	283.25		24.6	24.8888	0.083383
26	26.99146	0.982989	284.25		26	24.8954	1.220057
26	26.9751	0.950822	285.25		26	24.9026	1.204307
25.5	26.97254	2.168376	286.25		25.5	24.9102	0.347845
25.6	27.00866	1.984318	287.25		25.6	24.9183	0.464697
25	27.01721	4.069141	288.25		25	24.9269	0.005347
24.9	26.99525	4.390081	289.25		24.9	24.9359	0.001289
26.2	27.00935	0.655047	290.25		26.2	24.9454	1.574017
26.5	27.00405	0.254065	291.25		26.5	24.9554	2.385928
25.7	27.00986	1.715736	292.25		25.7	24.9658	0.5391
26.2	26.95763	0.574003	293.25		26.2	24.9766	1.496635
26	27.01319	1.026559	294.25		26	24.9879	1.024256
26.2	27.02463	0.680016	295.25		26.2	24.9997	1.440705
24.3	26.98049	7.185041	296.25		24.3	25.0119	0.506818
26.3	26.99741	0.48638	297.25		26.3	25.0246	1.626756
26.7	27.02837	0.107826	298.25		26.7	25.0376	2.763449
25.1	26.98695	3.560563	299.25		25.1	25.0512	0.002386
25.7	27.02066	1.744143	300.25		25.7	25.0651	0.40311
26.8	27.00706	0.042874	301.25		26.8	25.0795	2.960275
25.3	26.98517	2.839805	302.25		25.3	25.0942	0.042338
26.5	26.99385	0.24389	303.25		26.5	25.1094	1.933667
26	26.97756	0.955623	304.25		26	25.1250	0.765547
25.2	27.00294	3.250591	305.25	NOVEMBER	25.2	25.1411	0.003474
25.5	26.99496	2.234915	306.25		25.5	25.1575	0.117325
24.9	27.02329	4.508357	307.25		24.9	25.1743	0.07523
25.8	27.0265	1.504312	308.25		25.8	25.1915	0.370296
25.5	27.05226	2.409508	309.25		25.5	25.2091	0.084643
26.5	27.06118	0.314925	310.25		26.5	25.2270	1.620453
26.6	27.0475	0.200258	311.25		26.6	25.2454	1.835027
27.5	27.04796	0.204343	312.25		27.5	25.2641	4.999358
27.8	27.05974	0.547991	313.25		27.8	25.2831	6.334556
27.3	27.06021	0.057498	314.25		27.3	25.3026	3.989715
27.3	27.04371	0.065684	315.25		27.3	25.3224	3.911094
27.7	27.04419	0.430082	316.25		27.7	25.3425	5.557923
27.7	27.05885	0.411073	317.25		27.7	25.3629	5.461859
27.1	27.05368	0.002146	318.25		27.1	25.3837	2.945571
27.1	27.04851	0.002651	319.25		27.1	25.4049	2.873515
27.6	27.02075	0.335533	320.25		27.6	25.4263	4.724981
27.4	27.02972	0.137109	321.25		27.4	25.4481	3.810095
27.2	27.04156	0.025105	322.25		27.2	25.4701	2.992498
26.2	27.03924	0.704331	323.25		26.2	25.4925	0.500586
26.5	27.03977	0.291356	324.25		26.5	25.5151	0.969959
26.9	27.03747	0.018898	325.25		26.9	25.5381	1.854833
26.8	27.05223	0.063619	326.25		26.8	25.5613	1.534378
26.8	27.06705	0.071317	327.25		26.8	25.5848	1.476725

26.7	27.07621	0.141535	328.25		26.7	25.6086	1.191254
27.2	27.06248	0.018913	329.25		27.2	25.6326	2.456831
27.7	27.06591	0.402066	330.25		27.7	25.6568	4.174501
28	27.05219	0.898338	331.25		28	25.6814	5.376128
27.5	27.07282	0.182482	332.25		27.5	25.7061	3.218078
27.6	27.03907	0.314641	333.25		27.6	25.7311	3.492878
27.1	27.0568	0.001866	334.25		27.1	25.7563	1.805604
27.8	27.05739	0.551463	335.25	DECEMBER	27.8	25.7817	4.073608
26.6	27.03795	0.191803	336.25		26.6	25.8073	0.628378
27.2	27.04426	0.024255	337.25		27.2	25.8331	1.86839
27.2	27.08223	0.013869	338.25		27.2	25.8591	1.797982
26.5	27.09443	0.353344	339.25		26.5	25.8853	0.377862
26.7	27.09506	0.156076	340.25		26.7	25.9117	0.621492
28	27.08991	0.828267	341.25		28	25.9382	4.25112
28.4	27.08765	1.722265	342.25		28.4	25.9649	5.929924
28.4	27.09409	1.7054	343.25		28.4	25.9917	5.799973
28.2	27.09764	1.215192	344.25		28.2	26.0187	4.758252
28.1	27.08957	1.02096	345.25		28.1	26.0458	4.219891
28.3	27.09313	1.456541	346.25		28.3	26.0730	4.959564
28.4	27.08796	1.721445	347.25		28.4	26.1003	5.288444
28.1	27.08861	1.022911	348.25		28.1	26.1278	3.889603
28.2	27.10968	1.188801	349.25		28.2	26.1553	4.180608
28	27.09574	0.817686	350.25		28	26.1830	3.301518
28	27.09932	0.811231	351.25		28	26.2107	3.201521
28.7	27.1029	2.550728	352.25		28.7	26.2385	6.058865
28.2	27.07438	1.267025	353.25		28.2	26.2664	3.738836
28.3	27.02576	1.623696	354.25		28.3	26.2943	4.022753
28.4	27.06401	1.784856	355.25		28.4	26.3223	4.316854
27.4	27.03853	0.130664	356.25		27.4	26.3503	1.101844
25.7	27.03335	1.777814	357.25		25.7	26.3784	0.460174
27	27.04265	0.001819	358.25		27	26.4064	0.352321
26.1	27.05198	0.906264	359.25		26.1	26.4345	0.111904
25.9	27.03517	1.2886	360.25		25.9	26.4626	0.316535
26.2	27.03867	0.703374	361.25		26.2	26.4907	0.08451
26.5	27.04219	0.293967	362.25		26.5	26.5188	0.000353
25.9	26.34108	0.194551	363.25		25.9	26.5468	0.418412
26	26.34108	0.116335	364.25		26	26.5749	0.330489
26.1	26.34108	0.058119	365.25		26.1	26.6029	0.252887
26	26.34108	0.116335	1	JAN.1996	26	26.3701	0.136991
26.9	26.34108	0.312392	2		26.9	26.3981	0.251917
27	26.34108	0.434176	3		27	26.4260	0.329438
27.3	26.34108	0.919529	4		27.3	26.4540	0.715793
27.1	26.34108	0.57596	5		27.1	26.4818	0.38212
27.6	26.34108	1.584881	6		27.6	26.5097	1.188785
27.2	26.34108	0.737745	7		27.2	26.5375	0.438933
27.3	26.34108	0.919529	8		27.3	26.5652	0.539011
28	26.34108	2.752018	9		28	26.5929	1.979987
28	26.34108	2.752018	10		28	26.6205	1.903104
27.8	26.34108	2.128449	11		27.8	26.6480	1.327162
27.5	26.34108	1.343097	12		27.5	26.6754	0.679987
27.1	26.34108	0.57596	13		27.1	26.7027	0.15785
27.6	26.34108	1.584881	14		27.6	26.7299	0.757079
27.7	26.34108	1.846665	15		27.7	26.7570	0.889287
27.6	26.34108	1.584881	16		27.6	26.7839	0.665961
27.3	26.34108	0.919529	17		27.3	26.8108	0.239358
27.7	26.34108	1.846665	18		27.7	26.8374	0.744017

27.7	26.34108	1.846665	19		27.7	26.8640	0.698957
27.6	26.34108	1.584881	20		27.6	26.8903	0.503628
27.3	26.34108	0.919529	21		27.3	26.9165	0.147046
26.2	26.34108	0.019903	22		26.2	26.9426	0.551398
27.6	26.34108	1.584881	23		27.6	26.9684	0.398911
28.2	26.34108	3.455586	24		28.2	26.9941	1.454294
27.7	26.34108	1.846665	25		27.7	27.0195	0.463062
27.9	26.34108	2.430233	26		27.9	27.0448	0.731432
27.5	26.34108	1.343097	27		27.5	27.0698	0.185075
28.8	26.34108	6.046291	28		28.8	27.0946	2.908358
29.2	26.34108	8.173427	29		29.2	27.1192	4.329759
28.6	26.34108	5.102722	30		28.6	27.1435	2.121277
28.9	26.34108	6.548075	31		28.9	27.1676	3.001064
28.7	26.34108	5.564506	32	FEB.	28.7	27.1915	2.275592
28.7	26.34108	5.564506	33		28.7	27.2151	2.20497
28.4	26.34108	4.239154	34		28.4	27.2384	1.349285
28.8	26.34108	6.046291	35		28.8	27.2615	2.367086
29.2	26.34108	8.173427	36		29.2	27.2842	3.670137
29.3	26.34108	8.755211	37		29.3	27.3067	3.973139
28.6	26.34108	5.102722	38		28.6	27.3289	1.615646
26.9	26.34108	0.312392	39		26.9	27.3508	0.203231
28.1	26.34108	3.093802	40		28.1	27.3724	0.529407
27.9	26.34108	2.430233	41		27.9	27.3937	0.256372
27	26.34108	0.434176	42		27	27.4146	0.171908
28.3	26.34108	3.83737	43		28.3	27.4352	0.747805
27.5	26.34108	1.343097	44		27.5	27.4555	0.001977
28.3	26.34108	3.83737	45		28.3	27.4755	0.679824
27.2	26.34108	0.737745	46		27.2	27.4951	0.08708
26.7	26.34108	0.128824	47		26.7	27.5143	0.663163
27.3	26.34108	0.919529	48		27.3	27.5332	0.054404
26.6	26.34108	0.06704	49		26.6	27.5518	0.90589
28.3	26.34108	3.83737	50		28.3	27.5699	0.532973
28.5	26.34108	4.660938	51		28.5	27.5877	0.832212
28.2	26.34108	3.455586	52		28.2	27.6052	0.353838
28.8	26.34108	6.046291	53		28.8	27.6222	1.387245
29.3	26.34108	8.755211	54		29.3	27.6388	2.759501
29.2	26.34108	8.173427	55		29.2	27.6551	2.38681
28.9	26.34108	6.548075	56		28.9	27.6709	1.510652
27.8	26.34108	2.128449	57		27.8	27.6864	0.012916
28.5	26.34108	4.660938	58		28.5	27.7014	0.637788
28.5	26.34108	4.660938	59		28.5	27.7160	0.614656
26.8	26.34108	0.210608	59.25		26.8	27.7196	0.845643
26.4	26.34108	0.003472	60.25	MAR	26.4	27.7337	1.778705
28	26.34108	2.752018	61.25		28	27.7473	0.063832
26.9	26.34108	0.312392	62.25		26.9	27.7606	0.740614
25.8	26.34108	0.292767	63.25		25.8	27.7734	3.894299
28.3	26.34108	3.83737	64.25		28.3	27.7858	0.264432
28.7	26.34108	5.564506	65.25		28.7	27.7977	0.81414
28.6	26.34108	5.102722	66.25		28.6	27.8092	0.625377
28.8	26.34108	6.046291	67.25		28.8	27.8202	0.959941
29	26.34108	7.069859	68.25		29	27.8308	1.366967
28.2	26.34108	3.455586	69.25		28.2	27.8410	0.128906
26.5	26.34108	0.025256	70.25		26.5	27.8506	1.824248
28.3	26.34108	3.83737	71.25		28.3	27.8599	0.193715
27.5	26.34108	1.343097	72.25		27.5	27.8686	0.135888
26.2	26.34108	0.019903	73.25		26.2	27.8769	2.812078

27.3	26.34108	0.919529	74.25		27.3	27.8848	0.341936
28.8	26.34108	6.046291	75.25		28.8	27.8921	0.824263
29.2	26.34108	8.173427	76.25		29.2	27.8990	1.69261
29.2	26.34108	8.173427	77.25		29.2	27.9054	1.675968
29.3	26.34108	8.755211	78.25		29.3	27.9113	1.928367
29.1	26.34108	7.611643	79.25		29.1	27.9168	1.39996
28.1	26.34108	3.093802	80.25		28.1	27.9218	0.031763
27.5	26.34108	1.343097	81.25		27.5	27.9263	0.18171
25.9	26.34108	0.194551	82.25		25.9	27.9303	4.122074
25.9	26.34108	0.194551	83.25		25.9	27.9338	4.136421
28.2	26.34108	3.455586	84.25		28.2	27.9369	0.06924
28.5	26.34108	4.660938	85.25		28.5	27.9394	0.314245
29.1	26.34108	7.611643	86.25		29.1	27.9415	1.342128
26.9	26.34108	0.312392	87.25		26.9	27.9431	1.088023
25.6	26.34108	0.549199	88.25		25.6	27.9442	5.495187
26.3	26.34108	0.001688	89.25		26.3	27.9448	2.70534
27.7	26.34108	1.846665	90.25		27.7	27.9449	0.059983
28.4	26.34108	4.239154	91.25	APRIL	28.4	27.9445	0.207437
28.6	26.34108	5.102722	92.25		28.6	27.9437	0.430738
28.2	26.34108	3.455586	93.25		28.2	27.9424	0.066383
26.8	26.34108	0.210608	94.25		26.8	27.9405	1.30079
28	26.34108	2.752018	95.25		28	27.9382	0.003819
25.4	26.34108	0.88563	96.25		25.4	27.9354	6.428266
27.3	26.34108	0.919529	97.25		27.3	27.9321	0.399569
28.3	26.34108	3.83737	98.25		28.3	27.9283	0.138129
28.4	26.34108	4.239154	99.25		28.4	27.9241	0.226493
28.5	26.34108	4.660938	100.25		28.5	27.9193	0.337155
26.1	26.34108	0.058119	101.25		26.1	27.9141	3.291075
25.3	26.34108	1.083846	102.25		25.3	27.9084	6.803936
27.6	26.34108	1.584881	103.25		27.6	27.9023	0.091362
26.2	26.34108	0.019903	104.25		26.2	27.8956	2.875103
27.3	26.34108	0.919529	105.25		27.3	27.8885	0.346321
25.7	26.34108	0.410983	106.25		25.7	27.8809	4.756315
25.1	26.34108	1.540278	107.25		25.1	27.8728	7.688619
27.5	26.34108	1.343097	108.25		27.5	27.8643	0.13272
25.5	26.34108	0.707415	109.25		25.5	27.8553	5.547514
26.3	26.34108	0.001688	110.25		26.3	27.8459	2.369694
27.5	26.34108	1.343097	111.25		27.5	27.8360	0.112884
25.8	26.34108	0.292767	112.25		25.8	27.8256	4.103002
27.1	26.34108	0.57596	113.25		27.1	27.8148	0.510895
28.3	26.34108	3.83737	114.25		28.3	27.8035	0.246509
28.6	26.34108	5.102722	115.25		28.6	27.7918	0.653201
29.1	26.34108	7.611643	116.25		29.1	27.7796	1.743354
24.5	26.34108	3.389573	117.25		24.5	27.7670	10.6736
27.3	26.34108	0.919529	118.25		27.3	27.7540	0.206137
27	26.34108	0.434176	119.25		27	27.7406	0.548441
26.1	26.34108	0.058119	120.25		26.1	27.7267	2.646112
27.9	26.34108	2.430233	121.25	MAY	27.9	27.7124	0.035199
26	26.34108	0.116335	122.25		26	27.6977	2.882066
27.9	26.34108	2.430233	123.25		27.9	27.6825	0.047292
27.9	26.34108	2.430233	124.25		27.9	27.6670	0.054293
24.2	26.34108	4.584221	125.25		24.2	27.6510	11.90972
25.3	26.34108	1.083846	126.25		25.3	27.6347	5.450836
27.6	26.34108	1.584881	127.25		27.6	27.6180	0.000323
27.3	26.34108	0.919529	128.25		27.3	27.6008	0.090504
27.8	26.34108	2.128449	129.25		27.8	27.5833	0.046946

25.3	26.34108	1.083846	130.25		25.3	27.5654	5.132232
26.3	26.34108	0.001688	131.25		26.3	27.5472	1.555466
27.9	26.34108	2.430233	132.25		27.9	27.5286	0.137971
28	26.34108	2.752018	133.25		28	27.5096	0.240524
28.1	26.34108	3.093802	134.25		28.1	27.4902	0.371827
24.8	26.34108	2.374926	135.25		24.8	27.4705	7.131731
27.1	26.34108	0.57596	136.25		27.1	27.4505	0.122845
27.8	26.34108	2.128449	137.25		27.8	27.4301	0.136813
26.7	26.34108	0.128824	138.25		26.7	27.4094	0.503264
27.8	26.34108	2.128449	139.25		27.8	27.3884	0.169431
26.2	26.34108	0.019903	140.25		26.2	27.3670	1.361958
26.1	26.34108	0.058119	141.25		26.1	27.3454	1.550939
25.2	26.34108	1.302062	142.25		25.2	27.3234	4.508823
26.3	26.34108	0.001688	143.25		26.3	27.3011	1.002265
26.7	26.34108	0.128824	144.25		26.7	27.2786	0.334747
27	26.34108	0.434176	145.25		27	27.2557	0.065397
27.7	26.34108	1.846665	146.25		27.7	27.2326	0.218457
26.3	26.34108	0.001688	147.25		26.3	27.2092	0.826667
26.4	26.34108	0.003472	148.25		26.4	27.1856	0.617096
25	26.34108	1.798494	149.25		25	27.1616	4.672687
25.9	26.34108	0.194551	150.25		25.9	27.1375	1.531345
25.9	26.34108	0.194551	151.25		25.9	27.1131	1.471536
26.7	26.34108	0.128824	152.25	JUNE	26.7	27.0884	0.150876
26	26.34108	0.116335	153.25		26	27.0636	1.131156
24.8	26.34108	2.374926	154.25		24.8	27.0385	5.010747
26.7	26.34108	0.128824	155.25		26.7	27.0132	0.098075
27.6	26.34108	1.584881	156.25		27.6	26.9877	0.374955
27.4	26.34108	1.121313	157.25		27.4	26.9620	0.191877
25.6	26.34108	0.549199	158.25		25.6	26.9361	1.785088
25.8	26.34108	0.292767	159.25		25.8	26.9100	1.232101
26.1	26.34108	0.058119	160.25		26.1	26.8838	0.614273
25.3	26.34108	1.083846	161.25		25.3	26.8573	2.425328
24.8	26.34108	2.374926	162.25		24.8	26.8308	4.124068
24.1	26.34108	5.022437	163.25		24.1	26.8041	7.311967
26.2	26.34108	0.019903	164.25		26.2	26.7772	0.33317
25.4	26.34108	0.88563	165.25		25.4	26.7502	1.823096
24.9	26.34108	2.07671	166.25		24.9	26.7231	3.323723
24.9	26.34108	2.07671	167.25		24.9	26.6959	3.225182
26.3	26.34108	0.001688	168.25		26.3	26.6685	0.135824
26.7	26.34108	0.128824	169.25		26.7	26.6411	0.003468
26.9	26.34108	0.312392	170.25		26.9	26.6136	0.082037
27.4	26.34108	1.121313	171.25		27.4	26.5860	0.662645
26.4	26.34108	0.003472	172.25		26.4	26.5583	0.025055
26.3	26.34108	0.001688	173.25		26.3	26.5305	0.053147
24.4	26.34108	3.767789	174.25		24.4	26.5027	4.421471
26.2	26.34108	0.019903	175.25		26.2	26.4749	0.075555
27.3	26.34108	0.919529	176.25		27.3	26.4470	0.727649
25.1	26.34108	1.540278	177.25		25.1	26.4190	1.739889
24.5	26.34108	3.389573	178.25		24.5	26.3911	3.576246
25.1	26.34108	1.540278	179.25		25.1	26.3631	1.595497
26.2	26.34108	0.019903	180.25		26.2	26.3352	0.018267
25.6	26.34108	0.549199	181.25		25.6	26.3072	0.500111
23.1	26.34108	10.5046	182.25	JULY	23.1	26.2792	10.10747
23.1	26.34108	10.5046	183.25		23.1	26.2513	9.930591
24.6	26.34108	3.031357	184.25		24.6	26.2234	2.635332
24.2	26.34108	4.584221	185.25		24.2	26.1955	3.981993

25	26.34108	1.798494	186.25		25	26.1677	1.363431
24.5	26.34108	3.389573	187.25		24.5	26.1399	2.68921
25.6	26.34108	0.549199	188.25		25.6	26.1122	0.262311
26.3	26.34108	0.001688	189.25		26.3	26.0845	0.046434
22.5	26.34108	14.75389	190.25		22.5	26.0569	12.65186
24.7	26.34108	2.693142	191.25		24.7	26.0295	1.767473
23.7	26.34108	6.9753	192.25		23.7	26.0021	5.299554
23	26.34108	11.16281	193.25		23	25.9748	8.84939
23.5	26.34108	8.071732	194.25		23.5	25.9476	5.990847
24.7	26.34108	2.693142	195.25		24.7	25.9206	1.489789
23.7	26.34108	6.9753	196.25		23.7	25.8936	4.812082
25	26.34108	1.798494	197.25		25	25.8669	0.751445
24.8	26.34108	2.374926	198.25		24.8	25.8402	1.082053
25.4	26.34108	0.88563	199.25		25.4	25.8137	0.171171
23.6	26.34108	7.513516	200.25		23.6	25.7874	4.784722
24.5	26.34108	3.389573	201.25		24.5	25.7612	1.590731
24.8	26.34108	2.374926	202.25		24.8	25.7353	0.874711
25.2	26.34108	1.302062	203.25		25.2	25.7095	0.259552
25.5	26.34108	0.707415	204.25		25.5	25.6839	0.033804
25.4	26.34108	0.88563	205.25		25.4	25.6585	0.066799
24.4	26.34108	3.767789	206.25		24.4	25.6333	1.520928
24.5	26.34108	3.389573	207.25		24.5	25.6083	1.228283
24.1	26.34108	5.022437	208.25		24.1	25.5835	2.200841
24.7	26.34108	2.693142	209.25		24.7	25.5590	0.737878
25.1	26.34108	1.540278	210.25		25.1	25.5347	0.188974
25.5	26.34108	0.707415	211.25		25.5	25.5107	0.000114
24.3	26.34108	4.166005	212.25		24.3	25.4869	1.408693
23.9	26.34108	5.958869	213.25	AUGUST	23.9	25.4634	2.444086
24.3	26.34108	4.166005	214.25		24.3	25.4401	1.299824
22.5	26.34108	14.75389	215.25		22.5	25.4171	8.509553
21.9	26.34108	19.72319	216.25		21.9	25.3944	12.21091
24.1	26.34108	5.022437	217.25		24.1	25.3720	1.617978
24.5	26.34108	3.389573	218.25		24.5	25.3499	0.722295
25.2	26.34108	1.302062	219.25		25.2	25.3281	0.0164
24.9	26.34108	2.07671	220.25		24.9	25.3066	0.165288
24.8	26.34108	2.374926	221.25		24.8	25.2854	0.235579
24.4	26.34108	3.767789	222.25		24.4	25.2645	0.747351
25	26.34108	1.798494	223.25		25	25.2440	0.059513
24.1	26.34108	5.022437	224.25		24.1	25.2237	1.262805
22.8	26.34108	12.53924	225.25		22.8	25.2039	5.778638
24.6	26.34108	3.031357	226.25		24.6	25.1844	0.341477
24.4	26.34108	3.767789	227.25		24.4	25.1652	0.585521
24.2	26.34108	4.584221	228.25		24.2	25.1464	0.895644
23.8	26.34108	6.457084	229.25		23.8	25.1279	1.763427
23.8	26.34108	6.457084	230.25		23.8	25.1099	1.71575
24.2	26.34108	4.584221	231.25		24.2	25.0922	0.795963
23	26.34108	11.16281	232.25		23	25.0748	4.305
24.9	26.34108	2.07671	233.25		24.9	25.0579	0.024938
24.7	26.34108	2.693142	234.25		24.7	25.0414	0.116538
25.3	26.34108	1.083846	235.25		25.3	25.0252	0.075498
24.8	26.34108	2.374926	236.25		24.8	25.0095	0.043885
23.8	26.34108	6.457084	237.25		23.8	24.9942	1.425995
25	26.34108	1.798494	238.25		25	24.9792	0.000432
24.9	26.34108	2.07671	239.25		24.9	24.9647	0.004188
25.1	26.34108	1.540278	240.25		25.1	24.9506	0.022315
25.3	26.34108	1.083846	241.25		25.3	24.9370	0.131805

24	26.34108	5.480653	242.25		24	24.9237	0.853241
24.2	26.34108	4.584221	243.25		24.2	24.9109	0.505382
24.7	26.34108	2.693142	244.25	SEPTEMBER	24.7	24.8985	0.039414
23.2	26.34108	9.86638	245.25		23.2	24.8866	2.84461
24.2	26.34108	4.584221	246.25		24.2	24.8751	0.455771
25.1	26.34108	1.540278	247.25		25.1	24.8641	0.055665
24.4	26.34108	3.767789	248.25		24.4	24.8535	0.205638
25	26.34108	1.798494	249.25		25	24.8433	0.024544
25	26.34108	1.798494	250.25		25	24.8337	0.027671
24.3	26.34108	4.166005	251.25		24.3	24.8244	0.275027
25.1	26.34108	1.540278	252.25		25.1	24.8157	0.080844
24	26.34108	5.480653	253.25		24	24.8074	0.651854
23.1	26.34108	10.5046	254.25		23.1	24.7995	2.88846
23.5	26.34108	8.071732	255.25		23.5	24.7922	1.669753
24.8	26.34108	2.374926	256.25		24.8	24.7853	0.000216
24.1	26.34108	5.022437	257.25		24.1	24.7789	0.460894
24.5	26.34108	3.389573	258.25		24.5	24.7730	0.074505
24.5	26.34108	3.389573	259.25		24.5	24.7675	0.071556
24.2	26.34108	4.584221	260.25		24.2	24.7625	0.31643
23.9	26.34108	5.958869	261.25		23.9	24.7580	0.736207
24.2	26.34108	4.584221	262.25		24.2	24.7540	0.306928
23.9	26.34108	5.958869	263.25		23.9	24.7505	0.723317
23.1	26.34108	10.5046	264.25		23.1	24.7474	2.714043
24.7	26.34108	2.693142	265.25		24.7	24.7449	0.002014
24.7	26.34108	2.693142	266.25		24.7	24.7428	0.001832
24.2	26.34108	4.584221	267.25		24.2	24.7412	0.292916
24.3	26.34108	4.166005	268.25		24.3	24.7401	0.193704
24.3	26.34108	4.166005	269.25		24.3	24.7395	0.193168
24.9	26.34108	2.07671	270.25		24.9	24.7394	0.025797
23.9	26.34108	5.958869	271.25		23.9	24.7398	0.705184
24.9	26.34108	2.07671	272.25		24.9	24.7406	0.025406
24.7	26.34108	2.693142	273.25		24.7	24.7419	0.00176
25.3	26.34108	1.083846	274.25	OCTOBER	25.3	24.7438	0.309383
24.9	26.34108	2.07671	275.25		24.9	24.7461	0.023687
23.9	26.34108	5.958869	276.25		23.9	24.7489	0.720627
24.9	26.34108	2.07671	277.25		24.9	24.7522	0.021849
24.9	26.34108	2.07671	278.25		24.9	24.7560	0.020748
25.6	26.34108	0.549199	279.25		25.6	24.7602	0.705242
24.3	26.34108	4.166005	280.25		24.3	24.7650	0.216179
25.8	26.34108	0.292767	281.25		25.8	24.7702	1.060554
25.2	26.34108	1.302062	282.25		25.2	24.7759	0.179891
25.5	26.34108	0.707415	283.25		25.5	24.7820	0.515469
26.1	26.34108	0.058119	284.25		26.1	24.7887	1.719542
24.7	26.34108	2.693142	285.25		24.7	24.7958	0.009179
22.8	26.34108	12.53924	286.25		22.8	24.8034	4.013621
25.2	26.34108	1.302062	287.25		25.2	24.8115	0.15096
25.1	26.34108	1.540278	288.25		25.1	24.8200	0.078404
25.8	26.34108	0.292767	289.25		25.8	24.8290	0.942872
23	26.34108	11.16281	290.25		23	24.8384	3.379849
25.8	26.34108	0.292767	291.25		25.8	24.8483	0.905643
25.1	26.34108	1.540278	292.25		25.1	24.8587	0.058219
26.3	26.34108	0.001688	293.25		26.3	24.8695	2.046242
25.8	26.34108	0.292767	294.25		25.8	24.8808	0.844934
25.9	26.34108	0.194551	295.25		25.9	24.8925	1.01504
25.5	26.34108	0.707415	296.25		25.5	24.9047	0.354428
25.7	26.34108	0.410983	297.25		25.7	24.9173	0.612694

25.7	26.34108	0.410983	298.25		25.7	24.9303	0.592474
24.5	26.34108	3.389573	299.25		24.5	24.9437	0.196898
26.4	26.34108	0.003472	300.25		26.4	24.9576	2.080481
26.8	26.34108	0.210608	301.25		26.8	24.9719	3.341894
27.2	26.34108	0.737745	302.25		27.2	24.9866	4.898984
27.1	26.34108	0.57596	303.25		27.1	25.0018	4.402577
27.1	26.34108	0.57596	304.25		27.1	25.0173	4.337601
27.3	26.34108	0.919529	305.25	NOVEMBER	27.3	25.0333	5.138137
27.5	26.34108	1.343097	306.25		27.5	25.0496	6.004472
27.2	26.34108	0.737745	307.25		27.2	25.0663	4.552528
27.4	26.34108	1.121313	308.25		27.4	25.0835	5.366355
27.6	26.34108	1.584881	309.25		27.6	25.1010	6.245152
27.4	26.34108	1.121313	310.25		27.4	25.1189	5.203613
27.6	26.34108	1.584881	311.25		27.6	25.1371	6.065793
27.2	26.34108	0.737745	312.25		27.2	25.1557	4.178983
27.9	26.34108	2.430233	313.25		27.9	25.1747	7.427084
26.8	26.34108	0.210608	314.25		26.8	25.1941	2.578991
27.4	26.34108	1.121313	315.25		27.4	25.2138	4.779602
27.7	26.34108	1.846665	316.25		27.7	25.2338	6.082106
27.4	26.34108	1.121313	317.25		27.4	25.2542	4.604533
27.2	26.34108	0.737745	318.25		27.2	25.2749	3.706053
27.4	26.34108	1.121313	319.25		27.4	25.2959	4.427151
27.3	26.34108	0.919529	320.25		27.3	25.3173	3.931216
27.6	26.34108	1.584881	321.25		27.6	25.3389	5.112424
27.9	26.34108	2.430233	322.25		27.9	25.3609	6.447024
27.7	26.34108	1.846665	323.25		27.7	25.3832	5.367711
27.9	26.34108	2.430233	324.25		27.9	25.4057	6.221398
27.2	26.34108	0.737745	325.25		27.2	25.4286	3.13796
27.4	26.34108	1.121313	326.25		27.4	25.4517	3.795897
27.8	26.34108	2.128449	327.25		27.8	25.4751	5.405218
28.2	26.34108	3.455586	328.25		28.2	25.4987	7.296777
27.5	26.34108	1.343097	329.25		27.5	25.5227	3.909873
27.1	26.34108	0.57596	330.25		27.1	25.5468	2.412354
27.2	26.34108	0.737745	331.25		27.2	25.5712	2.652887
26.7	26.34108	0.128824	332.25		26.7	25.5959	1.219097
26.4	26.34108	0.003472	333.25		26.4	25.6207	0.607244
26.5	26.34108	0.025256	334.25		26.5	25.6458	0.729606
27.2	26.34108	0.737745	335.25	DECEMBER	27.2	25.6711	2.337441
26.5	26.34108	0.025256	336.25		26.5	25.6966	0.645394
27.7	26.34108	1.846665	337.25		27.7	25.7223	3.911148
27.6	26.34108	1.584881	338.25		27.6	25.7482	3.429058
27.9	26.34108	2.430233	339.25		27.9	25.7743	4.518601
27.4	26.34108	1.121313	340.25		27.4	25.8005	2.558259
27.5	26.34108	1.343097	341.25		27.5	25.8270	2.799084
27.7	26.34108	1.846665	342.25		27.7	25.8535	3.409489
27.3	26.34108	0.919529	343.25		27.3	25.8802	2.015732
27	26.34108	0.434176	344.25		27	25.9071	1.19445
28.1	26.34108	3.093802	345.25		28.1	25.9341	4.691212
27.7	26.34108	1.846665	346.25		27.7	25.9612	3.023453
27.8	26.34108	2.128449	347.25		27.8	25.9884	3.281819
27.5	26.34108	1.343097	348.25		27.5	26.0158	2.202976
27.1	26.34108	0.57596	349.25		27.1	26.0432	1.116841
26.6	26.34108	0.06704	350.25		26.6	26.0707	0.280137
27.9	26.34108	2.430233	351.25		27.9	26.0983	3.246015
27.9	26.34108	2.430233	352.25		27.9	26.1260	3.147027
27.5	26.34108	1.343097	353.25		27.5	26.1538	1.812353

27.5	26.34108	1.343097	354.25		27.5	26.1816	1.738256
28.4	26.34108	4.239154	355.25		28.4	26.2094	4.798611
27.8	26.34108	2.128449	356.25		27.8	26.2373	2.441959
27.8	26.34108	2.128449	357.25		27.8	26.2653	2.355452
27.8	26.34108	2.128449	358.25		27.8	26.2932	2.270436
27.3	26.34108	0.919529	359.25		27.3	26.3212	0.958108
27.5	26.34108	1.343097	360.25		27.5	26.3491	1.324471
27	26.34108	0.434176	361.25		27	26.3771	0.387986
27.7	26.34108	1.846665	362.25		27.7	26.4051	1.676831
27.3	26.34093	0.919814	363.25		27.3	26.4330	0.751661
27.4	26.34108	1.121313	364.25		27.4	26.4609	0.881853
27.7	26.34108	1.846665	365.25		27.7	26.4888	1.466989
19348.7	19539.54	1899.59			19348.7	19326.96	1315.526
		1.612023		Std. Dev.			1.341501
		43.58429		Variance			36.27019
		0.059623		Std. Error			0.049617

APPENDIX 3

The Results of Forecasted Daily Mean Temperature at Ilorin from 1995 to 1996

Actual	ANPTSM	dev^2				Actual	MNTTTSM	dev^2
24.7	26.086324	1.9219	1995	1	JAN.	24.7	26.5567	3.447261
25.3	26.115769	0.6655		2		25.3	26.5880	1.658932
25.2	26.145199	0.8934		3		25.2	26.6193	2.014388
25.8	26.174649	0.1404		4		25.8	26.6506	0.72345
25.9	26.204155	0.0925		5		25.9	26.6818	0.611192
26.8	26.233754	0.3206		6		26.8	26.7130	0.007574
26.2	26.263484	0.004		7		26.2	26.7441	0.296038
26.4	26.293385	0.0114		8		26.4	26.7752	0.140739
26.3	26.323498	0.0006		9		26.3	26.8061	0.256171
25	26.353865	1.8329		10		25	26.8370	3.374679
24.3	26.384529	4.3453		11		24.3	26.8678	6.593757
23.7	26.415534	7.3741		12		23.7	26.8985	10.23058
24.1	26.446925	5.5081		13		24.1	26.9291	8.003872
25.4	26.478749	1.1637		14		25.4	26.9596	2.432264
25.7	26.511051	0.6578		15		25.7	26.9899	1.663842
24.6	26.543881	3.7787		16		24.6	27.0201	5.856818
24.3	26.577286	5.186		17		24.3	27.0501	7.563172
24	26.611315	6.819		18		24	27.0800	9.486389
24.1	26.646019	6.4822		19		24.1	27.1097	9.058326
24.4	26.681446	5.205		20		24.4	27.1392	7.503405
25.4	26.717649	1.7362		21		25.4	27.1686	3.127862
24.8	26.754677	3.8208		22		24.8	27.1977	5.749073
25	26.792583	3.2134		23		25	27.2267	4.958032
25.1	26.831418	2.9978		24		25.1	27.2554	4.645712
25.3	26.871234	2.4688		25		25.3	27.2839	3.935847
25.3	26.912083	2.5988		26		25.3	27.3122	4.046832
25.6	26.954017	1.8334		27		25.6	27.3402	3.028316
26.5	26.997089	0.2471		28		26.5	27.3680	0.75341
26	27.041351	1.0844		29		26	27.3955	1.947481
27.3	27.086854	0.0454		30		27.3	27.4228	0.015076
27.7	27.133651	0.3208		31		27.7	27.4498	0.062611
27.6	26.099022	2.2529		32	FEB.	27.6	27.4765	0.015255
27.7	26.141226	2.4298		33		27.7	27.5029	0.038846
27.2	26.183488	1.0333		34		27.2	27.5290	0.10826
27	26.225853	0.5993		35		27	27.5548	0.307854
26.4	26.268366	0.0173		36		26.4	27.5803	1.393223
25.7	26.311074	0.3734		37		25.7	27.6055	3.631045
26.3	26.354023	0.0029		38		26.3	27.6304	1.769918
27	26.397259	0.3633		39		27	27.6549	0.428892
28	26.440828	2.431		40		28	27.6791	0.102996
29.2	26.484779	7.3724		41		29.2	27.7029	2.241336
29.8	26.529156	10.698		42		29.8	27.7264	4.300015
29.6	26.574008	9.1566		43		29.6	27.7494	3.424542
28.3	26.61938	2.8245		44		28.3	27.7722	0.278603
28.6	26.665318	3.743		45		28.6	27.7945	0.648807
28.1	26.711869	1.9269		46		28.1	27.8165	0.080389
27.7	26.759079	0.8853		47		27.7	27.8380	0.019053
28.8	26.806992	3.9721		48		28.8	27.8592	0.885109
29.8	26.855654	8.6692		49		29.8	27.8800	3.686574
29.3	26.90511	5.7355		50		29.3	27.9003	1.959162
29.3	26.955401	5.4971		51		29.3	27.9202	1.903779

28.1	27.006573	1.1956	52			28.1	27.9397	0.025688
27.8	27.058667	0.5496	53			27.8	27.9588	0.025216
27.4	27.111725	0.0831	54			27.4	27.9774	0.333424
28	27.165788	0.6959	55			28	27.9956	1.92E-05
29	27.220894	3.1652	56			29	28.0134	0.973452
29	27.277085	2.9684	57			29	28.0307	0.939633
30	27.334396	7.1054	58			30	28.0475	3.812317
29.2	27.392865	3.2657	59			29.2	28.0639	1.290832
	27.407667		59.25				28.0679	
28.6	26.100129	6.2494	60.25	MAR		28.6	28.0837	0.266615
29.5	26.143491	11.266	61.25			29.5	28.0990	1.962917
30.5	26.186964	18.602	62.25			30.5	28.1138	5.694018
30.6	26.23059	19.092	63.25			30.6	28.1281	6.110146
30	26.274413	13.88	64.25			30	28.1420	3.452223
30	26.318475	13.554	65.25			30	28.1553	3.402745
29.3	26.362819	8.627	66.25			29.3	28.1682	1.280942
29.8	26.407485	11.509	67.25			29.8	28.1806	2.622526
28.5	26.452513	4.1922	68.25			28.5	28.1924	0.094593
28.8	26.497943	5.2995	69.25			28.8	28.2038	0.355462
29.2	26.543812	7.0553	70.25			29.2	28.2146	0.970942
29.2	26.590159	6.8113	71.25			29.2	28.2250	0.950695
27.7	26.637019	1.1299	72.25			27.7	28.2348	0.285983
29.2	26.684427	6.3281	73.25			29.2	28.2441	0.913814
28	26.732417	1.6068	74.25			28	28.2528	0.063923
29.7	26.781022	8.5204	75.25			29.7	28.2611	2.070522
28.5	26.830273	2.788	76.25			28.5	28.2688	0.053463
24.4	26.880199	6.1514	77.25			24.4	28.2760	15.02307
28	26.930828	1.1431	78.25			28	28.2826	0.079867
28.3	26.982189	1.7366	79.25			28.3	28.2887	0.000127
25.5	27.034306	2.3541	80.25			25.5	28.2943	7.808069
26.6	27.087202	0.2374	81.25			26.6	28.2993	2.887714
26.3	27.140901	0.7071	82.25			26.3	28.3038	4.015305
27.8	27.195421	0.3655	83.25			27.8	28.3078	0.257836
27.8	27.250783	0.3016	84.25			27.8	28.3112	0.261311
29.2	27.307003	3.5834	85.25			29.2	28.3141	0.784903
29	27.364096	2.6762	86.25			29	28.3164	0.467344
29.3	27.422076	3.5266	87.25			29.3	28.3182	0.964029
30	27.480953	6.3456	88.25			30	28.3194	2.824484
30.1	27.540738	6.5498	89.25			30.1	28.3201	3.168174
29.3	27.601437	2.8851	90.25			29.3	28.3202	0.960008
27.9	26.089537	3.2778	91.25	APRIL		27.9	28.3198	0.176224
29.2	26.122346	9.472	92.25			29.2	28.3188	0.776455
29	26.155293	8.0924	93.25			29	28.3173	0.466038
29.6	26.188406	11.639	94.25			29.6	28.3153	1.650501
30	26.221715	14.275	95.25			30	28.3127	2.847023
29.8	26.255247	12.565	96.25			29.8	28.3095	2.221444
30.5	26.289027	17.732	97.25			30.5	28.3059	4.814219
29.6	26.32308	10.738	98.25			29.6	28.3016	1.685731
30.2	26.357428	14.765	99.25			30.2	28.2969	3.621876
29.6	26.39209	10.291	100.25			29.6	28.2916	1.711983
29.3	26.427087	8.2536	101.25			29.3	28.2857	1.028745
30	26.462434	12.514	102.25			30	28.2794	2.960636
30.4	26.498147	15.224	103.25			30.4	28.2724	4.526526
29.5	26.534238	8.7957	104.25			29.5	28.2650	1.525248
30	26.57072	11.76	105.25			30	28.2570	3.037996
25.2	26.607601	1.9813	106.25			25.2	28.2485	9.293426

27.2	26.644888	0.3081	107.25			27.2	28.2395	1.080527
30.3	26.682588	13.086	108.25			30.3	28.2299	4.285173
29.7	26.720702	8.8762	109.25			29.7	28.2199	2.190801
28.5	26.759233	3.0303	110.25			28.5	28.2093	0.084519
24.9	26.798179	3.6031	111.25			24.9	28.1982	10.878
27.6	26.837538	0.5813	112.25			27.6	28.1866	0.344067
24.2	26.877303	7.168	113.25			24.2	28.1745	15.79632
25.1	26.917469	3.3032	114.25			25.1	28.1618	9.374878
27.6	26.958026	0.4121	115.25			27.6	28.1487	0.301102
28.2	26.998962	1.4425	116.25			28.2	28.1351	0.00421
28.5	27.040263	2.1308	117.25			28.5	28.1210	0.143627
26.7	27.081914	0.1459	118.25			26.7	28.1064	1.978052
25.8	27.123897	1.7527	119.25			25.8	28.0914	5.250354
27.6	27.166191	0.1882	120.25			27.6	28.0758	0.226405
28.4	26.070337	5.4273	121.25	MAY		28.4	28.0598	0.115733
24.3	26.083957	3.1825	122.25			24.3	28.0433	14.01244
26.5	26.097702	0.1618	123.25			26.5	28.0264	2.329816
25.7	26.111582	0.1694	124.25			25.7	28.0090	5.331341
25.9	26.125603	0.0509	125.25			25.9	27.9911	4.372758
28.1	26.139769	3.8425	126.25			28.1	27.9728	0.016177
28.1	26.154085	3.7866	127.25			28.1	27.9541	0.021296
25.2	26.168551	0.9381	128.25			25.2	27.9349	7.479627
26.6	26.183165	0.1738	129.25			26.6	27.9153	1.72997
27.3	26.197925	1.2146	130.25			27.3	27.8953	0.354325
24.3	26.212824	3.6589	131.25			24.3	27.8748	12.77922
27.1	26.227856	0.7606	132.25			27.1	27.8539	0.568432
27.2	26.24301	0.9158	133.25			27.2	27.8327	0.400285
27.6	26.258276	1.8002	134.25			27.6	27.8110	0.044529
28	26.273639	2.9803	135.25			28	27.7890	0.044536
28.2	26.289083	3.6516	136.25			28.2	27.7665	0.1879
26.7	26.304591	0.1563	137.25			26.7	27.7437	1.089328
27.1	26.320143	0.6082	138.25			27.1	27.7205	0.385046
26.7	26.335716	0.1327	139.25			26.7	27.6970	0.993947
28	26.351286	2.7183	140.25			28	27.6731	0.10689
27.2	26.366828	0.6942	141.25			27.2	27.6488	0.201423
27.9	26.382314	2.3034	142.25			27.9	27.6242	0.076065
27.3	26.397712	0.8141	143.25			27.3	27.5993	0.08956
24.8	26.412991	2.6017	144.25			24.8	27.5740	7.695092
25.8	26.428118	0.3945	145.25			25.8	27.5484	3.056975
25.9	26.443055	0.2949	146.25			25.9	27.5225	2.632594
25.3	26.457766	1.3404	147.25			25.3	27.4963	4.823865
27.3	26.47221	0.6852	148.25			27.3	27.4698	0.028844
25.9	26.486345	0.3438	149.25			25.9	27.4431	2.381021
24.9	26.500129	2.5604	150.25			24.9	27.4160	6.330233
24.7	26.513515	3.2888	151.25			24.7	27.3887	7.228913
26.6	26.046768	0.3061	152.25	JUNE		26.6	27.3611	0.579226
27.3	26.036796	1.5957	153.25			27.3	27.3332	0.001104
24.6	26.026902	2.036	154.25			24.6	27.3051	7.317699
26	26.017071	0.0003	155.25			26	27.2768	1.630197
26.8	26.007286	0.6284	156.25			26.8	27.2482	0.20091
27	25.997527	1.005	157.25			27	27.2194	0.048157
28	25.987772	4.0491	158.25			28	27.1905	0.655363
25.5	25.977999	0.2285	159.25			25.5	27.1613	2.759781
26	25.968182	0.001	160.25			26	27.1319	1.281128
25.2	25.958295	0.575	161.25			25.2	27.1023	3.618726
26.7	25.948309	0.565	162.25			26.7	27.0725	0.13879

26.8	25.938193	0.7427	163.25			26.8	27.0426	0.058868
24.6	25.927915	1.7634	164.25			24.6	27.0126	5.820415
26.6	25.917441	0.4659	165.25			26.6	26.9823	0.146177
26.2	25.906735	0.086	166.25			26.2	26.9520	0.565457
25.9	25.895761	2E-05	167.25			25.9	26.9215	1.043415
26.5	25.884479	0.3789	168.25			26.5	26.8909	0.152775
26.8	25.872849	0.8596	169.25			26.8	26.8601	0.003617
24.6	25.860829	1.5897	170.25			24.6	26.8293	4.969843
26	25.848377	0.023	171.25			26	26.7984	0.637436
26.3	25.835446	0.2158	172.25			26.3	26.7674	0.218457
27.3	25.821991	2.1845	173.25			27.3	26.7363	0.317736
25.5	25.807965	0.0948	174.25			25.5	26.7052	1.452457
22.7	25.793318	9.5686	175.25			22.7	26.6740	15.79256
24.6	25.778001	1.3877	176.25			24.6	26.6427	4.172807
25	25.761963	0.5806	177.25			25	26.6115	2.596834
23.9	25.745152	3.4046	178.25			23.9	26.5802	7.1833
25.2	25.727514	0.2783	179.25			25.2	26.5488	1.819395
25.3	25.708995	0.1673	180.25			25.3	26.5175	1.482365
24.3	25.689539	1.9308	181.25			24.3	26.4862	4.779474
26	26.02663	0.0007	182.25	JULY		26	26.4549	0.206925
27	25.996473	1.0071	183.25			27	26.4236	0.332237
21.4	25.966329	20.851	184.25			21.4	26.3923	24.92347
24.4	25.93616	2.3598	185.25			24.4	26.3611	3.846003
26.7	25.905932	0.6305	186.25			26.7	26.3300	0.136934
23.7	25.875606	4.7333	187.25			23.7	26.2988	6.754
27.1	25.845143	1.5747	188.25			27.1	26.2678	0.692547
25.1	25.814504	0.5105	189.25			25.1	26.2368	1.292416
25.2	25.783646	0.3406	190.25			25.2	26.2060	1.011979
27	25.752527	1.5562	191.25			27	26.1752	0.680303
26.3	25.721104	0.3351	192.25			26.3	26.1445	0.024172
26.5	25.689332	0.6572	193.25			26.5	26.1140	0.149017
26.3	25.657167	0.4132	194.25			26.3	26.0835	0.046853
27.7	25.62456	4.3075	195.25			27.7	26.0533	2.711783
25.8	25.591466	0.0435	196.25			25.8	26.0231	0.049774
26.5	25.557836	0.8877	197.25			26.5	25.9931	0.256943
25.6	25.523623	0.0058	198.25			25.6	25.9633	0.131965
24.7	25.488776	0.6222	199.25			24.7	25.9336	1.521785
26.2	25.453246	0.5576	200.25			26.2	25.9041	0.087543
25.8	25.416983	0.1467	201.25			25.8	25.8748	0.005599
25	25.379936	0.1444	202.25			25	25.8457	0.715265
25.1	25.342055	0.0586	203.25			25.1	25.8168	0.513867
26.4	25.303287	1.2028	204.25			26.4	25.7882	0.374333
26.5	25.263581	1.5287	205.25			26.5	25.7597	0.548009
25.2	25.222886	0.0005	206.25			25.2	25.7315	0.282501
25.5	25.18115	0.1017	207.25			25.5	25.7035	0.041427
25.3	25.13832	0.0261	208.25			25.3	25.6758	0.141235
26.5	25.094346	1.9759	209.25			26.5	25.6483	0.725311
26.8	25.049174	3.0654	210.25			26.8	25.6212	1.389685
26.4	25.002755	1.9523	211.25			26.4	25.5942	0.649266
26.5	24.955036	2.3869	212.25			26.5	25.5676	0.869386
26.7	26.014368	0.4701	213.25	AUGUST		26.7	25.5412	1.342713
27.2	25.971889	1.5083	214.25			27.2	25.5152	2.838556
26.4	25.92935	0.2215	215.25			26.4	25.4895	0.829084
22.3	25.886705	12.864	216.25			22.3	25.4640	10.01113
23.6	25.843908	5.0351	217.25			23.6	25.4389	3.381688
25.3	25.800913	0.2509	218.25			25.3	25.4142	0.013034

24.9	25.757674	0.7356	219.25			24.9	25.3897	0.239842
23.1	25.714145	6.8338	220.25			23.1	25.3657	5.133181
26	25.67028	0.1087	221.25			26	25.3419	0.433068
25.5	25.62603	0.0159	222.25			25.5	25.3186	0.032924
24.4	25.581351	1.3956	223.25			24.4	25.2955	0.802004
26	25.536195	0.2151	224.25			26	25.2729	0.528648
24.4	25.490516	1.1892	225.25			24.4	25.2507	0.723641
24.9	25.444269	0.2962	226.25			24.9	25.2288	0.108117
26.2	25.397407	0.6442	227.25			26.2	25.2073	0.985358
24.4	25.349885	0.9023	228.25			24.4	25.1863	0.618245
25	25.301658	0.091	229.25			25	25.1656	0.027434
26.7	25.252682	2.0947	230.25			26.7	25.1454	2.41681
26.9	25.202913	2.8801	231.25			26.9	25.1256	3.148599
25.3	25.152308	0.0218	232.25			25.3	25.1062	0.037567
26.5	25.100824	1.9577	233.25			26.5	25.0872	1.995959
25.2	25.048419	0.023	234.25			25.2	25.0687	0.017242
26.6	24.995053	2.5759	235.25			26.6	25.0506	2.4006
26.4	24.940686	2.1296	236.25			26.4	25.0330	1.868736
25.7	24.885278	0.6638	237.25			25.7	25.0158	0.46812
26.6	24.828791	3.1372	238.25			26.6	24.9991	2.56291
26.4	24.771189	2.653	239.25			26.4	24.9828	2.008343
26.4	24.712436	2.8479	240.25			26.4	24.9671	2.05332
26.3	24.652497	2.7143	241.25			26.3	24.9518	1.817772
27	24.591338	5.8017	242.25			27	24.9369	4.256278
27.2	24.528929	7.1346	243.25			27.2	24.9226	5.186633
23.9	26.014237	4.47	244.25	SEPTEMBER		23.9	24.9087	1.01753
24.2	25.97157	3.1385	245.25			24.2	24.8954	0.483531
27	25.928788	1.1475	246.25			27	24.8825	4.483814
27.9	25.885848	4.0568	247.25			27.9	24.8701	9.180098
26.9	25.842708	1.1179	248.25			26.9	24.8583	4.168658
27.9	25.799327	4.4128	249.25			27.9	24.8469	9.321314
26.3	25.755665	0.2963	250.25			26.3	24.8361	2.143077
26.5	25.711681	0.6214	251.25			26.5	24.8257	2.803123
25.9	25.667338	0.0541	252.25			25.9	24.8159	1.175193
27.2	25.622598	2.4882	253.25			27.2	24.8066	5.728136
26.4	25.577426	0.6766	254.25			26.4	24.7979	2.566783
24.6	25.531785	0.8682	255.25			24.6	24.7896	0.035964
26.1	25.485642	0.3774	256.25			26.1	24.7819	1.737306
26.4	25.438965	0.9236	257.25			26.4	24.7748	2.641434
26.8	25.391722	1.9832	258.25			26.8	24.7681	4.1286
25	25.343883	0.1183	259.25			25	24.7620	0.056647
25.9	25.29542	0.3655	260.25			25.9	24.7564	1.307778
26.2	25.246306	0.9095	261.25			26.2	24.7514	2.09849
28.9	25.196515	13.716	262.25			28.9	24.7469	17.24834
26.6	25.146024	2.114	263.25			26.6	24.7429	3.44869
23.5	25.09481	2.5434	264.25			23.5	24.7395	1.536422
27	25.042853	3.8304	265.25			27	24.7367	5.122715
25.5	24.990133	0.26	266.25			25.5	24.7343	0.58624
27.2	24.936635	5.1228	267.25			27.2	24.7326	6.088256
26.7	24.882342	3.3039	268.25			26.7	24.7313	3.875657
26.9	24.827241	4.2963	269.25			26.9	24.7306	4.706089
27.3	24.771322	6.3942	270.25			27.3	24.7305	6.602274
26.1	24.714573	1.9194	271.25			26.1	24.7309	1.874377
25.6	24.656989	0.8893	272.25			25.6	24.7319	0.753636
27.1	24.598562	6.2572	273.25			27.1	24.7334	5.600887
26.1	26.025722	0.0055	274.25	OCTOBER		26.1	24.7354	1.862053

25.5	25.994506	0.2445	275.25			25.5	24.7380	0.580608
27	25.963153	1.0751	276.25			27	24.7412	5.102349
28.3	25.931634	5.6092	277.25			28.3	24.7448	12.63913
27.3	25.899922	1.9602	278.25			27.3	24.7491	6.507253
26.2	25.867993	0.1102	279.25			26.2	24.7538	2.091397
26.6	25.835823	0.584	280.25			26.6	24.7591	3.388771
26.9	25.803389	1.2026	281.25			26.9	24.7650	4.558303
26.8	25.770673	1.0595	282.25			26.8	24.7714	4.115377
26.8	25.737655	1.1286	283.25			26.8	24.7783	4.087374
27	25.704319	1.6788	284.25			27	24.7857	4.903035
27.9	25.670651	4.97	285.25			27.9	24.7937	9.649126
27.9	25.636638	5.1228	286.25			27.9	24.8022	9.596372
27.2	25.60227	2.5527	287.25			27.2	24.8112	5.706237
27.1	25.567537	2.3484	288.25			27.1	24.8208	5.194857
27.2	25.532433	2.7808	289.25			27.2	24.8308	5.612689
28.1	25.496954	6.7759	290.25			28.1	24.8414	10.61827
27.9	25.461095	5.9483	291.25			27.9	24.8525	9.287071
26.5	25.424858	1.1559	292.25			26.5	24.8641	2.676043
27.7	25.388243	5.3442	293.25			27.7	24.8763	7.97355
26.1	25.351254	0.5606	294.25			26.1	24.8889	1.466839
27.1	25.313896	3.1902	295.25			27.1	24.9020	4.831276
26.8	25.276178	2.322	296.25			26.8	24.9156	3.550989
27	25.238109	3.1043	297.25			27	24.9297	4.286172
26.9	25.199701	2.891	298.25			26.9	24.9443	3.824846
28	25.160968	8.0601	299.25			28	24.9593	9.245577
26.8	25.121928	2.8159	300.25			26.8	24.9749	3.331025
27.9	25.082597	7.9378	301.25			27.9	24.9909	8.462822
26.9	25.042998	3.4485	302.25			26.9	25.0074	3.581968
27.6	25.003153	6.7436	303.25			27.6	25.0243	6.634037
28.3	24.963087	11.135	304.25			28.3	25.0417	10.61625
26.1	26.04629	0.0029	306.25	NOVEMBER		26.1	25.0596	1.082439
36	26.035635	99.289	306.25			36	25.0779	119.2923
23.2	26.024859	7.9798	307.25			23.2	25.0966	3.597251
26.7	26.013956	0.4707	308.25			26.7	25.1158	2.509625
26.5	26.002922	0.2471	309.25			26.5	25.1354	1.862057
26.2	25.991757	0.0434	310.25			26.2	25.1555	1.091066
26.9	25.980459	0.8456	311.25			26.9	25.1759	2.972496
28.1	25.969031	4.541	312.25			28.1	25.1968	8.428765
28.3	25.957479	5.4874	313.25			28.3	25.2180	9.498536
28.5	25.945808	6.5239	314.25			28.5	25.2397	10.6296
28.4	25.934027	6.081	315.25			28.4	25.2617	9.848635
28.2	25.922147	5.1886	316.25			28.2	25.2842	8.501975
27.8	25.910181	3.5714	317.25			27.8	25.3070	6.215038
26.9	25.898144	1.0037	318.25			26.9	25.3302	2.464303
28.3	25.886052	5.8271	319.25			28.3	25.3537	8.680436
28.1	25.873924	4.9554	320.25			28.1	25.3777	7.411184
28.8	25.861782	8.6331	321.25			28.8	25.4019	11.54702
26.2	25.849649	0.1227	322.25			26.2	25.4265	0.598286
27.1	25.83755	1.5938	323.25			27.1	25.4514	2.717731
27.7	25.825512	3.5137	324.25			27.7	25.4767	4.943026
28.1	25.813563	5.2278	325.25			28.1	25.5023	6.748096
27.4	25.801736	2.5544	326.25			27.4	25.5282	3.503696
28.4	25.790062	6.8118	327.25			28.4	25.5544	8.097546
28.2	25.778577	5.8633	328.25			28.2	25.5809	6.859819
28.2	25.767319	5.9179	329.25			28.2	25.6077	6.720252
29.7	25.756324	15.553	330.25			29.7	25.6347	16.52654

29.2	25.745634	11.933		331.25		29.2	25.6620	12.51711
27.7	25.735291	3.8601		332.25		27.7	25.6896	4.04154
28	25.725339	5.1741		333.25		28	25.7175	5.209847
28.8	25.715824	9.5121		334.25		28.8	25.7456	9.329442
29	26.069131	8.59		335.25	DECEMBER	29	25.7739	10.4076
29.6	26.081342	12.381		336.25		29.6	25.8025	14.42115
28.7	26.09348	6.7939		337.25		28.7	25.8313	8.229653
28.5	26.105564	5.7333		338.25		28.5	25.8603	6.968247
27.8	26.117613	2.8304		339.25		27.8	25.8895	3.650193
28.6	26.129649	6.1026		340.25		28.6	25.9188	7.188609
27.7	26.141694	2.4283		341.25		27.7	25.9484	3.068046
28.8	26.153775	7.0025		342.25		28.8	25.9782	7.962745
29.9	26.165918	13.943		343.25		29.9	26.0081	15.14702
30	26.178153	14.607		344.25		30	26.0382	15.6962
30.2	26.190509	16.076		345.25		30.2	26.0684	17.07028
29.3	26.20302	9.5913		346.25		29.3	26.0987	10.24805
29.6	26.215719	11.453		347.25		29.6	26.1292	12.04622
29.5	26.228643	10.702		348.25		29.5	26.1598	11.15662
29.4	26.241827	9.9741		349.25		29.4	26.1906	10.30044
29.7	26.255312	11.866		350.25		29.7	26.2214	12.10068
29.5	26.269137	10.438		351.25		29.5	26.2523	10.54746
29.9	26.283344	13.08		352.25		29.9	26.2833	13.0804
29.6	26.297976	10.903		353.25		29.6	26.3144	10.79522
30.1	26.313079	14.341		354.25		30.1	26.3455	14.09603
29.9	26.328698	12.754		355.25		29.9	26.3767	12.41346
30	26.344879	13.36		356.25		30	26.4080	12.90271
27.5	26.361673	1.2958		357.25		27.5	26.4392	1.125209
27.6	26.379128	1.4905		358.25		27.6	26.4705	1.275673
25.6	26.397295	0.6357		359.25		25.6	26.5019	0.813354
25.4	26.416226	1.0327		360.25		25.4	26.5332	1.284113
26.6	26.435973	0.0269		361.25		26.6	26.5645	0.00126
26.1	26.456591	0.1272		362.25		26.1	26.5958	0.245839
26	26.478134	0.2286		363.25		26	26.6271	0.393268
27.5	26.500658	0.9987		364.25		27.5	26.6584	0.708341
26.6	26.524219	0.0057		365.25		26.6	26.6896	0.008026
27.3	26.056832	1.5455	1996	1	JAN.	27.3	26.6434	0.431162
28.5	26.089215	5.8119		2		28.5	26.6748	3.331398
28.7	26.121584	6.6482		3		28.7	26.7062	3.975293
26.8	26.153973	0.4174		4		26.8	26.7376	0.003899
29.2	26.186422	9.0817		5		29.2	26.7689	5.91031
28.9	26.218969	7.1879		6		28.9	26.8002	4.409284
29.2	26.251655	8.6927		7		29.2	26.8314	5.610282
29.3	26.284521	9.0931		8		29.3	26.8626	5.941134
28.3	26.31761	3.9299		9		28.3	26.8936	1.977852
28.9	26.350964	6.4976		10		28.9	26.9246	3.902064
29.2	26.38463	7.9263		11		29.2	26.9555	5.037611
29.8	26.418651	11.434		12		29.8	26.9863	7.916712
28.8	26.453073	5.5081		13		28.8	27.0170	3.179025
28.4	26.487945	3.656		14		28.4	27.0476	1.829046
29.9	26.523312	11.402		15		29.9	27.0780	7.963657
29.3	26.559224	7.5119		16		29.3	27.1083	4.803593
27.7	26.595729	1.2194		17		27.7	27.1384	0.315368
28.7	26.632876	4.273		18		28.7	27.1684	2.345807
29.2	26.670714	6.3973		19		29.2	27.1982	4.007198
30.5	26.709295	14.369		20		30.5	27.2278	10.70712
29.3	26.748667	6.5093		21		29.3	27.2573	4.172768

28	26.788882	1.4668	22			28	27.2865	0.509074
29.9	26.82999	9.425	23			29.9	27.3155	6.679425
30.5	26.872042	13.162	24			30.5	27.3444	9.958045
30.1	26.915089	10.144	25			30.1	27.3730	7.43674
30.4	26.959182	11.839	26			30.4	27.4013	8.992034
30.2	27.00437	10.212	27			30.2	27.4295	7.675925
30.3	27.050706	10.558	28			30.3	27.4573	8.080766
31.3	27.098238	17.655	29			31.3	27.4850	14.5546
30.7	27.147017	12.624	30			30.7	27.5123	10.1614
31.8	27.197093	21.187	31			31.8	27.5394	18.15285
31.3	27.248514	16.415	32	FEB.		31.3	27.5662	13.94141
30.8	26.100045	22.09	33			30.8	27.5927	10.28686
31.1	26.14331	24.569	34			31.1	27.6189	12.1181
30.7	26.186673	20.37	35			30.7	27.6448	9.334278
31.1	26.230179	23.715	36			31.1	27.6704	11.76229
31.8	26.273875	30.538	37			31.8	27.6956	16.84573
31.3	26.317807	24.822	38			31.3	27.7206	12.81226
30.8	26.362022	19.696	39			30.8	27.7452	9.331961
31.2	26.406564	22.977	40			31.2	27.7694	11.76885
31.7	26.451481	27.547	41			31.7	27.7933	15.26213
30.3	26.496819	14.464	42			30.3	27.8169	6.165978
30.5	26.542623	15.661	43			30.5	27.8400	7.075427
30.7	26.588938	16.901	44			30.7	27.8628	8.049536
31.1	26.635811	19.929	45			31.1	27.8852	10.33464
31.5	26.683284	23.201	46			31.5	27.9073	12.90768
31.7	26.731403	24.687	47			31.7	27.9289	14.22114
31.6	26.780211	23.23	48			31.6	27.9501	13.32148
30	26.829751	10.05	49			30	27.9710	4.116983
30.8	26.880066	15.366	50			30.8	27.9914	7.888369
30.3	26.931196	11.349	51			30.3	28.0114	5.237842
30.3	26.983182	11.001	52			30.3	28.0309	5.148673
31.2	27.036065	17.336	53			31.2	28.0501	9.9221
32	27.089882	24.109	54			32	28.0688	15.45467
32.2	27.144673	25.556	55			32.2	28.0870	16.9167
32.5	27.200473	28.085	56			32.5	28.1048	19.3177
31.8	27.257317	20.636	57			31.8	28.1222	13.52654
31.8	27.315242	20.113	58			31.8	28.1390	13.40262
31.3	27.374278	15.411	59			31.3	28.1555	9.888114
30.5	27.426373	9.4472	59.25			30.5	28.1595	5.477964
31.1	27.449687	13.325	60.25	MAR		31.1	28.1753	8.553709
31.3	26.099178	27.049	61.25			31.3	28.1907	9.667846
39.8	26.141625	186.55	62.25			39.8	28.2056	134.4311
31.3	26.184215	26.171	63.25			31.3	28.2199	9.48671
31.2	26.22699	24.731	64.25			31.2	28.2338	8.798046
31.5	26.269992	27.353	65.25			31.5	28.2473	10.58034
31.5	26.31326	26.902	66.25			31.5	28.2602	10.49654
31.8	26.356833	29.628	67.25			31.8	28.2726	12.44276
32.6	26.40075	38.431	68.25			32.6	28.2845	18.62379
32.1	26.445047	31.978	69.25			32.1	28.2959	14.47147
28.3	26.48976	3.277	70.25			28.3	28.3067	4.54E-05
30.7	26.534925	17.348	71.25			30.7	28.3171	5.678209
30.1	26.580573	12.386	72.25			30.1	28.3269	3.143732
28.9	26.626739	5.1677	73.25			28.9	28.3363	0.3178
30.9	26.673452	17.864	74.25			30.9	28.3451	6.527734
31.4	26.720742	21.895	75.25			31.4	28.3533	9.282237
32	26.768636	27.367	76.25			32	28.3611	13.24189

32.3	26.817162	30.062	77.25			32.3	28.3683	15.45856
32.3	26.866345	29.525	78.25			32.3	28.3749	15.40616
32.1	26.916206	26.872	79.25			32.1	28.3811	13.83049
31.3	26.966769	18.777	80.25			31.3	28.3867	8.487578
29.9	27.018053	8.3056	81.25			29.9	28.3917	2.274948
30.5	27.070076	11.764	82.25			30.5	28.3962	4.425904
29.7	27.122855	6.6417	83.25			29.7	28.4002	1.689525
31.3	27.176404	17.004	84.25			31.3	28.4036	8.389108
31.7	27.230735	19.974	85.25			31.7	28.4065	10.84727
32.7	27.285861	29.313	86.25			32.7	28.4088	18.41432
28.7	27.341789	1.8447	87.25			28.7	28.4106	0.083758
29.9	27.398526	6.2574	88.25			29.9	28.4118	2.214666
30.5	27.456078	9.2655	89.25			30.5	28.4125	4.357613
30.9	27.514446	11.462	90.25			30.9	28.4126	6.186922
31.1	27.573633	12.435	91.25	APRIL		31.1	28.4122	7.224075
31.5	26.086697	29.304	92.25			31.5	28.4113	9.540214
29	26.116689	8.3135	93.25			29	28.4098	0.348373
27.4	26.146836	1.5704	94.25			27.4	28.4077	1.015485
29.4	26.177163	10.387	95.25			29.4	28.4051	0.989805
27.7	26.207693	2.227	96.25			27.7	28.4020	0.49275
28.6	26.238451	5.5769	97.25			28.6	28.3983	0.040696
29.3	26.269455	9.1842	98.25			29.3	28.3940	0.820782
29.5	26.300726	10.235	99.25			29.5	28.3892	1.233768
28.1	26.33228	3.1248	100.25			28.1	28.3839	0.080614
27.9	26.364132	2.3589	101.25			27.9	28.3781	0.228545
26.6	26.396296	0.0415	102.25			26.6	28.3717	3.138794
27	26.428783	0.3263	103.25			27	28.3647	1.862483
28	26.461602	2.3667	104.25			28	28.3573	0.127633
27.8	26.494761	1.7036	105.25			27.8	28.3493	0.301683
25.8	26.528265	0.5304	106.25			25.8	28.3407	6.455287
27.3	26.562117	0.5445	107.25			27.3	28.3317	1.064339
27.6	26.596319	1.0074	108.25			27.6	28.3221	0.521409
25.3	26.63087	1.7712	109.25			25.3	28.3120	9.072051
27.3	26.665767	0.4023	110.25			27.3	28.3014	1.002731
27.1	26.701006	0.1592	111.25			27.1	28.2902	1.416647
27.5	26.736578	0.5828	112.25			27.5	28.2786	0.606193
28.5	26.772475	2.9843	113.25			28.5	28.2664	0.054555
29.6	26.808686	7.7914	114.25			29.6	28.2538	1.812328
29.1	26.845197	5.0841	115.25			29.1	28.2406	0.738543
29.9	26.881992	9.1084	116.25			29.9	28.2270	2.799059
27.1	26.919054	0.0327	117.25			27.1	28.2128	1.238358
28.8	26.956362	3.399	118.25			28.8	28.1982	0.362185
26.3	26.993895	0.4815	119.25			26.3	28.1831	3.545936
27.2	27.031627	0.0283	120.25			27.2	28.1675	0.935999
28.4	27.069534	1.7701	121.25	MAY		28.4	28.1514	0.061801
28.4	26.066439	5.4455	122.25			28.4	28.1349	0.070297
28.3	26.076163	4.9455	123.25			28.3	28.1179	0.033174
28.2	26.08601	4.469	124.25			28.2	28.1004	0.00992
26.2	26.095983	0.0108	125.25			26.2	28.0825	3.543758
27	26.106083	0.7991	126.25			27	28.0641	1.132363
28.3	26.116309	4.7685	127.25			28.3	28.0453	0.064861
28.1	26.126659	3.8941	128.25			28.1	28.0261	0.005464
28.4	26.137128	5.1206	129.25			28.4	28.0064	0.154914
24.8	26.147708	1.8163	130.25			24.8	27.9863	10.15259
27.2	26.158391	1.085	131.25			27.2	27.9658	0.586446
29.2	26.169165	9.186	132.25			29.2	27.9449	1.575351

27.7	26.180017	2.3103	133.25			27.7	27.9235	0.049969
27.4	26.190931	1.4618	134.25			27.4	27.9018	0.251807
24.3	26.201891	3.6172	135.25			24.3	27.8797	12.81409
27.1	26.212877	0.787	136.25			27.1	27.8572	0.5733
27.5	26.223868	1.6285	137.25			27.5	27.8343	0.111739
27	26.23484	0.5855	138.25			27	27.8110	0.657739
28.3	26.245767	4.2199	139.25			28.3	27.7874	0.262777
27.4	26.256622	1.3073	140.25			27.4	27.7634	0.132056
27.1	26.267376	0.6933	141.25			27.1	27.7391	0.408394
25.8	26.277998	0.2285	142.25			25.8	27.7144	3.664837
25	26.288453	1.6601	143.25			25	27.6894	7.232654
26.5	26.298707	0.0405	144.25			26.5	27.6640	1.35493
26.4	26.308723	0.0083	145.25			26.4	27.6383	1.533508
27.1	26.318462	0.6108	146.25			27.1	27.6124	0.262524
26	26.327883	0.1075	147.25			26	27.5861	2.515675
26.7	26.336943	0.1318	148.25			26.7	27.5595	0.738754
23.4	26.345599	8.6766	149.25			23.4	27.5326	17.07871
25.4	26.353805	0.9097	150.25			25.4	27.5055	4.433094
25.9	26.361512	0.213	151.25			25.9	27.4781	2.490306
24.6	26.368672	3.1282	152.25	JUNE		24.6	27.4504	8.124698
25.4	26.042873	0.4133	153.25			25.4	27.4224	4.090286
24.5	26.028989	2.3378	154.25			24.5	27.3943	8.376732
26.7	26.01516	0.469	155.25			26.7	27.3658	0.443334
27.6	26.001366	2.5556	156.25			27.6	27.3372	0.069075
25.1	25.987585	0.7878	157.25			25.1	27.3083	4.876599
25	25.973791	0.9483	158.25			25	27.2792	5.194818
27.4	25.959958	2.0737	159.25			27.4	27.2499	0.022523
26.7	25.946059	0.5684	160.25			26.7	27.2204	0.270855
24	25.932063	3.7329	161.25			24	27.1908	10.18099
24.7	25.91794	1.4834	162.25			24.7	27.1609	6.056124
24.9	25.903655	1.0073	163.25			24.9	27.1309	4.976937
26.4	25.889174	0.2609	164.25			26.4	27.1007	0.491026
25.8	25.87446	0.0055	165.25			25.8	27.0704	1.613944
23.1	25.859476	7.6147	166.25			23.1	27.0399	15.5232
23.3	25.844181	6.4729	167.25			23.3	27.0094	13.75934
26.5	25.828536	0.4509	168.25			26.5	26.9786	0.229102
26.6	25.812497	0.6202	169.25			26.6	26.9478	0.12098
26.3	25.796021	0.254	170.25			26.3	26.9169	0.38056
27.3	25.779063	2.3132	171.25			27.3	26.8859	0.171499
25.9	25.761576	0.0192	172.25			25.9	26.8548	0.911591
26	25.743513	0.0658	173.25			26	26.8236	0.67831
33.3	25.724825	57.383	174.25			33.3	26.7924	42.34945
26.4	25.705462	0.4824	175.25			26.4	26.7611	0.130363
26.8	25.685374	1.2424	176.25			26.8	26.7297	0.00494
23.6	25.664508	4.2622	177.25			23.6	26.6983	9.599706
26	25.642811	0.1276	178.25			26	26.6669	0.444803
25.5	25.62023	0.0145	179.25			25.5	26.6355	1.289394
25.5	25.596709	0.0094	180.25			25.5	26.6041	1.219008
17.3	25.572195	68.429	181.25			17.3	26.5727	85.98225
24.9	25.54663	0.4181	182.25	JULY		24.9	26.5412	2.693695
22.5	26.023801	12.417	183.25			22.5	26.5099	16.07895
24.2	25.990783	3.2069	184.25			24.2	26.4785	5.191541
25.3	25.95774	0.4326	185.25			25.3	26.4472	1.316011
25.3	25.924634	0.3902	186.25			25.3	26.4159	1.245244
26	25.891426	0.0118	187.25			26	26.3847	0.14799
25.8	25.858074	0.0034	188.25			25.8	26.3536	0.306422

24.4	25.824536	2.0293	189.25			24.4	26.3225	3.695974
22.4	25.79077	11.497	190.25			22.4	26.2915	15.14391
24.7	25.756732	1.1167	191.25			24.7	26.2606	2.4356
24.8	25.722376	0.8508	192.25			24.8	26.2299	2.044532
22.2	25.687659	12.164	193.25			22.2	26.1992	15.99375
23.4	25.652532	5.0739	194.25			23.4	26.1687	7.665648
25.2	25.61695	0.1738	195.25			25.2	26.1383	0.880404
25	25.580864	0.3374	196.25			25	26.1081	1.227775
24.6	25.544227	0.8916	197.25			24.6	26.0780	2.184352
25.7	25.506989	0.0373	198.25			25.7	26.0480	0.12112
25.3	25.469101	0.0286	199.25			25.3	26.0183	0.515902
24.5	25.430514	0.8659	200.25			24.5	25.9887	2.216179
24.6	25.391178	0.626	201.25			24.6	25.9593	1.847681
25	25.351042	0.1232	202.25			25	25.9301	0.865093
24.9	25.310057	0.1681	203.25			24.9	25.9011	1.002242
24.1	25.268172	1.3646	204.25			24.1	25.8724	3.141239
26	25.225336	0.6001	205.25			26	25.8438	0.024394
24.6	25.181498	0.3381	206.25			24.6	25.8155	1.477454
24.8	25.136609	0.1133	207.25			24.8	25.7874	0.97504
24.8	25.090619	0.0845	208.25			24.8	25.7596	0.920885
24.3	25.043476	0.5528	209.25			24.3	25.7321	2.050835
25	24.995132	2E-05	210.25			25	25.7048	0.496726
25	24.945536	0.003	211.25			25	25.6778	0.459383
25.2	24.894641	0.0932	212.25			25.2	25.6511	0.203449
24.5	24.842397	0.1172	213.25	AUGUST		24.5	25.6246	1.264772
25	26.013431	1.027	214.25			25	25.5985	0.35819
24	25.969977	3.8808	215.25			24	25.5727	2.47328
23.1	25.926422	7.9887	216.25			23.1	25.5472	5.988594
25.1	25.88272	0.6127	217.25			25.1	25.5220	0.178066
24.9	25.838827	0.8814	218.25			24.9	25.4971	0.356563
25	25.794695	0.6315	219.25			25	25.4726	0.223368
25.4	25.750278	0.1227	220.25			25.4	25.4485	0.002348
23.8	25.70553	3.631	221.25			23.8	25.4246	2.639476
25.1	25.660406	0.3141	222.25			25.1	25.4012	0.090721
24.2	25.614859	2.0018	223.25			24.2	25.3781	1.387969
23.1	25.568844	6.0952	224.25			23.1	25.3554	5.086911
23.7	25.522316	3.3208	225.25			23.7	25.3331	2.667011
24.7	25.47523	0.601	226.25			24.7	25.3112	0.373527
24.3	25.427542	1.2714	227.25			24.3	25.2896	0.979376
24.1	25.379209	1.6364	228.25			24.1	25.2685	1.365399
25.3	25.330186	0.0009	229.25			25.3	25.2478	0.002727
24.1	25.280433	1.3934	230.25			24.1	25.2275	1.271199
24.2	25.229906	1.0607	231.25			24.2	25.2076	1.015237
22.8	25.178566	5.6576	232.25			22.8	25.1881	5.703179
24	25.126372	1.2587	233.25			24	25.1691	1.366817
25	25.073286	0.0054	234.25			25	25.1505	0.022658
25.4	25.019268	0.145	235.25			25.4	25.1324	0.071617
23.8	24.964283	1.3556	236.25			23.8	25.1147	1.728435
24.8	24.908294	0.0117	237.25			24.8	25.0975	0.088487
24.8	24.851266	0.0026	238.25			24.8	25.0807	0.078791
23.6	24.793167	1.4236	239.25			23.6	25.0644	2.144447
25.2	24.733963	0.2172	240.25			25.2	25.0486	0.022934
24.2	24.673625	0.2243	241.25			24.2	25.0332	0.694229
24.2	24.612123	0.1698	242.25			24.2	25.0183	0.669661
25.1	24.549428	0.3031	243.25			25.1	25.0039	0.009228
24.7	24.485515	0.046	244.25	SEPTEMBER		24.7	24.9900	0.084122

23.5	26.01546	6.3275	245.25			23.5	24.9766	2.180441
24.3	25.973982	2.8022	246.25			24.3	24.9637	0.440529
21.4	25.932357	20.542	247.25			21.4	24.9513	12.61186
23.7	25.890544	4.7985	248.25			23.7	24.9394	1.536155
24.6	25.848504	1.5588	249.25			24.6	24.9280	0.107601
24.2	25.806199	2.5799	250.25			24.2	24.9171	0.514302
24.3	25.763591	2.1421	251.25			24.3	24.9068	0.368191
24.4	25.720645	1.7441	252.25			24.4	24.8969	0.246954
24.6	25.677325	1.1606	253.25			24.6	24.8876	0.082728
23.4	25.633597	4.989	254.25			23.4	24.8788	2.186941
24.2	25.58943	1.9305	255.25			24.2	24.8706	0.449657
25	25.544792	0.2968	256.25			25	24.8628	0.018816
24.6	25.499654	0.8094	257.25			24.6	24.8556	0.065344
24.1	25.453987	1.8333	258.25			24.1	24.8490	0.560936
24.8	25.407764	0.3694	259.25			24.8	24.8428	0.001834
24.3	25.360962	1.1256	260.25			24.3	24.8372	0.288619
23.5	25.313555	3.289	261.25			23.5	24.8322	1.774706
24.3	25.265523	0.9322	262.25			24.3	24.8277	0.278437
24.8	25.216845	0.1738	263.25			24.8	24.8237	0.000562
23.4	25.167503	3.1241	264.25			23.4	24.8203	2.017205
24.8	25.11748	0.1008	265.25			24.8	24.8174	0.000303
24.6	25.066761	0.2179	266.25			24.6	24.8151	0.046259
24.2	25.015334	0.6648	267.25			24.2	24.8133	0.376133
24.2	24.963187	0.5825	268.25			24.2	24.8121	0.374621
24.5	24.910312	0.1684	269.25			24.5	24.8114	0.096956
24.1	24.8567	0.5726	270.25			24.1	24.8112	0.505863
23.5	24.802349	1.6961	271.25			23.5	24.8117	1.72043
25.4	24.747253	0.4261	272.25			25.4	24.8126	0.345025
24.7	24.691412	7E-05	273.25			24.7	24.8141	0.013023
25.1	24.634828	0.2164	274.25	OCTOBER		25.1	24.8162	0.080557
24.7	26.028709	1.7655	275.25			24.7	24.8188	0.014108
24.6	26.000458	1.9613	276.25			24.6	24.8219	0.049251
24.9	25.972055	1.1493	277.25			24.9	24.8256	0.005532
25.2	25.943475	0.5528	278.25			25.2	24.8299	0.137005
26.3	25.914697	0.1485	279.25			26.3	24.8348	2.147282
24.3	25.885699	2.5144	280.25			24.3	24.8400	0.291558
25	25.856464	0.7335	281.25			25	24.8458	0.02377
24.8	25.826975	1.0547	282.25			24.8	24.8522	0.002727
24.9	25.797218	0.805	283.25			24.9	24.8592	0.001668
25	25.767178	0.5886	284.25			25	24.8666	0.017788
23.4	25.736846	5.4609	285.25			23.4	24.8746	2.174538
24.1	25.706213	2.5799	286.25			24.1	24.8832	0.613343
25.3	25.675271	0.1408	287.25			25.3	24.8922	0.166285
25.3	25.644017	0.1183	288.25			25.3	24.9018	0.158562
25.9	25.612446	0.0827	289.25			25.9	24.9119	0.976335
23.5	25.580558	4.3287	290.25			23.5	24.9225	2.023573
26.4	25.548355	0.7253	291.25			26.4	24.9337	2.150159
25.4	25.515839	0.0134	292.25			25.4	24.9453	0.206748
25.3	25.483017	0.0335	293.25			25.3	24.9575	0.117335
26.1	25.449896	0.4226	294.25			26.1	24.9701	1.27664
23.6	25.416485	3.2996	295.25			23.6	24.9833	1.913444
26.7	25.382797	1.735	296.25			26.7	24.9969	2.900459
26	25.348845	0.424	297.25			26	25.0111	0.977978
24.8	25.314645	0.2649	298.25			24.8	25.0257	0.050943
25.1	25.280216	0.0325	299.25			25.1	25.0408	0.003502
26.4	25.245579	1.3327	300.25			26.4	25.0564	1.805214

27.5	25.210755	5.2406	301.25			27.5	25.0725	5.892822
26.7	25.17577	2.3233	302.25			26.7	25.0890	2.595242
25.7	25.140651	0.3129	303.25			25.7	25.1060	0.352805
26	25.105426	0.8003	304.25			26	25.1235	0.768276
26	25.070126	0.8647	305.25	NOVEMBER		26	25.1414	0.737193
25.4	26.050254	0.4228	306.25			25.4	25.1598	0.057714
25	26.043562	1.089	307.25			25	25.1786	0.031886
25	26.036756	1.0749	308.25			25	25.1978	0.039128
25.8	26.029833	0.0528	309.25			25.8	25.2175	0.339331
25.6	26.022797	0.1788	310.25			25.6	25.2376	0.131352
25.5	26.015651	0.2659	311.25			25.5	25.2581	0.05852
26	26.008401	7E-05	312.25			26	25.2790	0.519815
26.1	26.001056	0.0098	313.25			26.1	25.3004	0.639438
24.7	25.993625	1.6735	314.25			24.7	25.3221	0.386989
25.4	25.986122	0.3435	315.25			25.4	25.3442	0.003113
26.4	25.97856	0.1776	316.25			26.4	25.3667	1.067663
26.2	25.970955	0.0525	317.25			26.2	25.3896	0.656726
26.3	25.963327	0.1133	318.25			26.3	25.4129	0.786987
25.7	25.955695	0.0654	319.25			25.7	25.4365	0.069429
27.3	25.948083	1.8277	320.25			27.3	25.4605	3.383786
26.5	25.940514	0.313	321.25			26.5	25.4848	1.030569
26.4	25.933015	0.2181	322.25			26.4	25.5095	0.79297
26.5	25.925615	0.3299	323.25			26.5	25.5345	0.932135
26.4	25.918343	0.232	324.25			26.4	25.5599	0.705813
25.8	25.911232	0.0124	325.25			25.8	25.5855	0.045994
27	25.904316	1.2005	326.25			27	25.6115	1.927885
26.7	25.897631	0.6438	327.25			26.7	25.6378	1.128269
27.6	25.891215	2.9199	328.25			27.6	25.6644	3.746626
27.3	25.885107	2.0019	329.25			27.3	25.6912	2.588083
27.1	25.879349	1.49	330.25			27.1	25.7184	1.908828
27.1	25.873983	1.5031	331.25			27.1	25.7458	1.83381
27.2	25.869055	1.7714	332.25			27.2	25.7735	2.034696
26.8	25.86461	0.875	333.25			26.8	25.8014	0.997117
27.3	25.860698	2.0716	334.25			27.3	25.8296	2.16199
27.9	25.857366	4.1724	335.25	DECEMBER		27.9	25.8581	4.169541
28	26.072963	3.7135	336.25			28	25.8867	4.465996
28.2	26.089026	4.4562	337.25			28.2	25.9156	5.218549
28	26.105041	3.5909	338.25			28	25.9447	4.224367
26.4	26.12103	0.0778	339.25			26.4	25.9740	0.181506
25.9	26.13702	0.0562	340.25			25.9	26.0035	0.010702
27.4	26.153035	1.5549	341.25			27.4	26.0331	1.868357
27.7	26.169105	2.3436	342.25			27.7	26.0630	2.679872
28	26.18526	3.2933	343.25			28	26.0930	3.636714
28.3	26.201531	4.4036	344.25			28.3	26.1232	4.738652
27.8	26.217951	2.5029	345.25			27.8	26.1535	2.711038
27.7	26.234555	2.1475	346.25			27.7	26.1839	2.298444
27.4	26.251381	1.3193	347.25			27.4	26.2145	1.40534
25.6	26.268465	0.4468	348.25			25.6	26.2452	0.416337
25.4	26.285847	0.7847	349.25			25.4	26.2761	0.767492
26.6	26.303569	0.0879	350.25			26.6	26.3070	0.085853
27	26.321673	0.4601	351.25			27	26.3380	0.438228
26.4	26.340201	0.0036	352.25			26.4	26.3691	0.000954
26.2	26.3592	0.0253	353.25			26.2	26.4003	0.040117
27	26.378715	0.386	354.25			27	26.4315	0.323154
26.8	26.398794	0.161	355.25			26.8	26.4628	0.113684
27	26.419485	0.337	356.25			27	26.4942	0.255863

26.2	26.440837	0.058	357.25			26.2	26.5255	0.105982
25.3	26.462902	1.3523	358.25			25.3	26.5570	1.57993
25.9	26.485731	0.3431	359.25			25.9	26.5884	0.473858
26.4	26.509376	0.012	360.25			26.4	26.6198	0.048313
26.9	26.53389	0.134	361.25			26.9	26.6512	0.061888
26.4	26.559328	0.0254	362.25			26.4	26.6826	0.079885
27.2	26.585744	0.3773	363.25			27.2	26.7140	0.236165
27.7	26.613194	1.1811	364.25			27.7	26.7454	0.911275
28.2	26.641734	2.4282	365.25			28.2	26.7767	2.025746
19748.2	19076.441	3681.5				19748.2	19451.59	2937.843
27.01532	26.060712	5.0363				27.01532	26.57322	4.018937
		2.2442		Std.Dev.				2.004729
		0.0031		Std. Error				0.002739

APPENDIX 4

The Results of Forecasted Daily Mean Temperature at Minna from 1995 to 1996

Actual	ANPTSM	dev^2				Actual	MNTTTSM	dev^2
25.4	25.261	0.019321	1995	1	JAN.	25.4	27.6674	5.140902
26.4	25.30322	1.202926		2		26.4	27.7105	1.717466
27.5	25.346322	4.638331		3		27.5	27.7537	0.064344
27.2	25.3903	3.275013		4		27.2	27.7968	0.356123
26.9	25.435153	2.145778		5		26.9	27.8398	0.883239
28	25.480875	6.34599		6		28	27.8828	0.013738
28	25.527465	6.113429		7		28	27.9257	0.005522
28.2	25.574919	6.89105		8		28.2	27.9685	0.053591
27.8	25.623235	4.738307		9		27.8	28.0112	0.044609
27.4	25.672409	2.984569		10		27.4	28.0538	0.427451
26.6	25.722441	0.770111		11		26.6	28.0963	2.238779
24.2	25.773326	2.475355		12		24.2	28.1386	15.51232
24.3	25.825064	2.32582		13		24.3	28.1807	15.06003
25.1	25.877652	0.604743		14		25.1	28.2227	9.751334
25.9	25.931088	0.000966		15		25.9	28.2645	5.590943
25.6	25.985371	0.148511		16		25.6	28.3061	7.323126
25.6	26.040498	0.194038		17		25.6	28.3475	7.54892
25.5	26.096467	0.355773		18		25.5	28.3887	8.344655
25.7	26.153278	0.205461		19		25.7	28.4297	7.451047
26.8	26.210927	0.347007		20		26.8	28.4704	2.790117
28.4	26.269414	4.539398		21		28.4	28.5108	0.012279
27.2	26.328735	0.759102		22		27.2	28.5510	1.825163
26.8	26.38889	0.169012		23		26.8	28.5909	3.207249
25.9	26.449875	0.302363		24		25.9	28.6305	7.455512
26.9	26.511689	0.150785		25		26.9	28.6698	3.132089
26.9	26.574329	0.106062		26		26.9	28.7087	3.271558
26.7	26.637792	0.00387		27		26.7	28.7474	4.1918
27.3	26.702076	0.357513		28		27.3	28.7857	2.207275
27.8	26.767178	1.066722		29		27.8	28.8236	1.047834
28.6	26.833093	3.12196		30		28.6	28.8612	0.068236
29.2	26.89982	5.29083		31		29.2	28.8984	0.090947
29	25.278279	13.85121		32	FEB.	29	28.9352	0.004194
29	25.337237	13.41583		33		29	28.9717	0.000803
29.1	25.396532	13.71568		34		29.1	29.0077	0.008525
27.3	25.456158	3.399755		35		27.3	29.0433	3.038936
27.7	25.516108	4.769385		36		27.7	29.0784	1.900009
27.2	25.576377	2.636153		37		27.2	29.1131	3.660024
27.5	25.636958	3.470927		38		27.5	29.1474	2.713849
28	25.697845	5.29992		39		28	29.1812	1.395162
29	25.759031	10.50388		40		29	29.2145	0.046005
29	25.820511	10.10915		41		29	29.2473	0.061169
30.3	25.882279	19.51626		42		30.3	29.2797	1.041087
29.4	25.944327	11.94168		43		29.4	29.3115	0.007832
29.5	26.006649	12.2035		44		29.5	29.3428	0.024705
29.6	26.069239	12.46627		45		29.6	29.3736	0.051248
30.2	26.132089	16.5479		46		30.2	29.4039	0.633799
29.7	26.195193	12.28367		47		29.7	29.4336	0.070964
29.5	26.258544	10.50704		48		29.5	29.4628	0.001385
29.8	26.322133	12.09556		49		29.8	29.4914	0.095238
30	26.385953	13.06133		50		30	29.5194	0.230941
30.5	26.449997	16.40252		51		30.5	29.5469	0.908394

30	26.514256	12.15041	52			30	29.5738	0.181661
26.6	26.578722	0.000453	53			26.6	29.6001	9.000418
29.4	26.643385	7.598926	54			29.4	29.6258	0.050965
30.3	26.708237	12.90076	55			30.3	29.6508	0.421422
31.3	26.773268	20.49131	56			31.3	29.6753	2.639692
30.5	26.838467	13.40682	57			30.5	29.6991	0.641409
29.2	26.903825	5.272418	58			29.2	29.7223	0.272819
30.7	26.969331	13.91789	59			30.7	29.7449	0.91225
	26.98573		59.25				29.7504	
31.7	25.279483	41.22303	60.25	MAR		31.7	29.7722	3.716508
31.1	25.339061	33.18841	61.25			31.1	29.7933	1.707532
31.3	25.398392	34.82897	62.25			31.3	29.8137	2.209051
31.2	25.457469	32.97666	63.25			31.2	29.8335	1.867367
32	25.516285	42.03856	64.25			32	29.8526	4.611405
32.3	25.574832	45.22789	65.25			32.3	29.8710	5.900036
32.5	25.633103	47.15428	66.25			32.5	29.8887	6.818699
31.8	25.69109	37.31878	67.25			31.8	29.9058	3.588065
32.7	25.748786	48.31938	68.25			32.7	29.9221	7.716553
33	25.806182	51.75102	69.25			33	29.9378	9.377181
32.8	25.86327	48.11823	70.25			32.8	29.9527	8.106963
31.6	25.920041	32.26193	71.25			31.6	29.9670	2.666809
32.2	25.976487	38.73212	72.25			32.2	29.9805	4.926243
32.9	26.032597	47.16122	73.25			32.9	29.9933	8.448959
32.3	26.088363	36.58443	74.25			32.3	30.0054	5.265309
32.6	26.143774	41.68285	75.25			32.6	30.0167	6.673276
32.6	26.198821	40.97509	76.25			32.6	30.0274	6.618474
29.5	26.253492	10.53982	77.25			29.5	30.0373	0.288646
31	26.307776	22.01697	78.25			31	30.0464	0.909316
32	26.361661	31.79086	79.25			32	30.0548	3.783634
31.5	26.415136	25.85584	80.25			31.5	30.0625	2.066328
32	26.468189	30.60093	81.25			32	30.0695	3.726953
31.8	26.520806	27.86989	82.25			31.8	30.0757	2.973334
31.2	26.572974	21.40937	83.25			31.2	30.0811	1.251907
32.5	26.624679	34.5194	84.25			32.5	30.0858	5.828292
32.9	26.675907	38.73934	85.25			32.9	30.0898	7.897418
32.7	26.726642	35.681	86.25			32.7	30.0930	6.796629
34.2	26.776871	55.10285	87.25			34.2	30.0954	16.84763
33.4	26.826576	43.20991	88.25			33.4	30.0971	10.90909
33.4	26.875741	42.56596	89.25			33.4	30.0981	10.90287
34.1	26.924349	51.48997	90.25			34.1	30.0982	16.01409
33.9	25.264497	74.57192	91.25	APRIL		33.9	30.0977	14.45768
33.5	25.308518	67.10037	92.25			33.5	30.0964	11.5848
32.2	25.351724	46.89888	93.25			32.2	30.0943	4.434042
32.8	25.394109	54.84722	94.25			32.8	30.0915	7.336192
33	25.435666	57.21915	95.25			33	30.0879	8.480421
33.4	25.476389	62.78362	96.25			33.4	30.0836	10.99879
33.8	25.516271	68.62017	97.25			33.8	30.0785	13.84969
31.3	25.555305	33.00152	98.25			31.3	30.0727	1.506365
32.2	25.593483	43.64606	99.25			32.2	30.0661	4.553569
32.2	25.630798	43.15441	100.25			32.2	30.0588	4.584831
32.7	25.667241	49.45969	101.25			32.7	30.0507	7.018664
33.1	25.702804	54.71851	102.25			33.1	30.0419	9.351789
32.7	25.737477	48.47673	103.25			32.7	30.0324	7.116086
31.7	25.77125	35.15007	104.25			31.7	30.0221	2.815223
31.3	25.804115	30.20476	105.25			31.3	30.0111	1.661151
26.4	25.836059	0.318029	106.25			26.4	29.9994	12.95584

28.1	25.867073	4.985964	107.25			28.1	29.9870	3.560687
32.6	25.897144	44.92827	108.25			32.6	29.9738	6.896852
32.3	25.926262	40.62454	109.25			32.3	29.9599	5.475908
30.2	25.954413	18.02501	110.25			30.2	29.9453	0.06485
27.3	25.981586	1.738216	111.25			27.3	29.9300	6.917134
29.3	26.007766	10.83881	112.25			29.3	29.9140	0.37705
27.8	26.032939	3.122503	113.25			27.8	29.8973	4.398857
27.1	26.057093	1.087655	114.25			27.1	29.8800	7.728147
30.2	26.080211	16.97266	115.25			30.2	29.8619	0.114327
30.2	26.102279	16.79131	116.25			30.2	29.8431	0.127365
29.2	26.123281	9.466198	117.25			29.2	29.8237	0.388979
27.3	26.143201	1.338184	118.25			27.3	29.8036	6.267894
27.4	26.162022	1.53259	119.25			27.4	29.7828	5.677769
28.9	26.179726	7.399888	120.25			28.9	29.7614	0.741976
29.8	25.237725	20.81435	121.25	MAY		29.8	29.7393	0.003684
27.2	25.254642	3.784416	122.25			27.2	29.7166	6.333176
28.3	25.270415	9.178387	123.25			28.3	29.6932	1.941064
26.6	25.285039	1.729123	124.25			26.6	29.6692	9.420179
27.5	25.298511	4.846553	125.25			27.5	29.6446	4.599387
28.9	25.310828	12.88216	126.25			28.9	29.6194	0.517522
27.8	25.321985	6.14056	127.25			27.8	29.5936	3.216837
27.3	25.331977	3.873116	128.25			27.3	29.5671	5.139826
27.7	25.340799	5.56583	129.25			27.7	29.5401	3.385934
30.4	25.348446	25.5182	130.25			30.4	29.5125	0.787692
24.7	25.354911	0.428908	131.25			24.7	29.4843	22.88946
27.3	25.360188	3.762869	132.25			27.3	29.4555	4.646353
28.9	25.364271	12.50138	133.25			28.9	29.4262	0.276917
29.5	25.367152	17.08043	134.25			29.5	29.3964	0.010739
30.2	25.368823	23.34027	135.25			30.2	29.3660	0.695606
29.7	25.369277	18.75516	136.25			29.7	29.3350	0.133196
28.3	25.368504	8.593669	137.25			28.3	29.3036	1.007189
29.4	25.366496	16.26915	138.25			29.4	29.2716	0.01648
28.7	25.363244	11.13394	139.25			28.7	29.2392	0.290694
30.5	25.358737	26.43259	140.25			30.5	29.2062	1.673908
29.6	25.352966	18.0373	141.25			29.6	29.1728	0.182529
28.5	25.34592	9.948218	142.25			28.5	29.1389	0.408136
27.9	25.337589	6.56595	143.25			27.9	29.1045	1.45078
27	25.327961	2.795715	144.25			27	29.0697	4.283496
27.5	25.317024	4.765382	145.25			27.5	29.0344	2.354377
28.6	25.304767	10.85856	146.25			28.6	28.9987	0.158966
26.9	25.291178	2.588308	147.25			26.9	28.9626	4.254295
28.7	25.276243	11.72211	148.25			28.7	28.9261	0.05111
26.9	25.25995	2.689763	149.25			26.9	28.8892	3.956757
27.8	25.242286	6.5419	150.25			27.8	28.8519	1.106408
26.6	25.223237	1.895476	151.25			26.6	28.8142	4.902613
27.2	25.205076	3.979722	152.25	JUNE		27.2	28.7761	2.48424
28.4	25.189323	10.30845	153.25			28.4	28.7378	0.114081
26.3	25.172407	1.271465	154.25			26.3	28.6990	5.755354
27.8	25.154329	6.999575	155.25			27.8	28.6600	0.739561
25.6	25.135088	0.216143	156.25			25.6	28.6206	9.124066
27.4	25.114686	5.222662	157.25			27.4	28.5809	1.394603
29.1	25.09312	16.05509	158.25			29.1	28.5410	0.312517
26.7	25.07039	2.655628	159.25			26.7	28.5007	3.242605
26.8	25.046496	3.074777	160.25			26.8	28.4602	2.756304
27.6	25.021434	6.649	161.25			27.6	28.4194	0.671491
28.7	24.995205	13.72551	162.25			28.7	28.3784	0.103402

27.9	24.967804	8.597773	163.25			27.9	28.3372	0.191143
26.1	24.93923	1.347387	164.25			26.1	28.2957	4.821292
27.8	24.90948	8.355105	165.25			27.8	28.2541	0.206192
27.8	24.878551	8.534866	166.25			27.8	28.2122	0.169935
27.7	24.846439	8.142812	167.25			27.7	28.1702	0.221089
28.1	24.813141	10.80345	168.25			28.1	28.1280	0.000784
28.3	24.778652	12.39989	169.25			28.3	28.0857	0.045944
25.4	24.742969	0.431689	170.25			25.4	28.0432	6.986307
27.4	24.706088	7.25716	171.25			27.4	28.0005	0.360652
28.5	24.668004	14.68419	172.25			28.5	27.9578	0.29397
28.7	24.628712	16.57538	173.25			28.7	27.9150	0.616265
26.3	24.588208	2.930232	174.25			26.3	27.8721	2.471344
22.9	24.546486	2.710916	175.25			22.9	27.8291	24.29555
26.2	24.503542	2.877971	176.25			26.2	27.7860	2.515364
24.7	24.45937	0.057903	177.25			24.7	27.7429	9.259113
25.5	24.413965	1.179473	178.25			25.5	27.6997	4.838821
26.3	24.367321	3.735247	179.25			26.3	27.6566	1.84026
27.1	24.319434	7.731545	180.25			27.1	27.6134	0.263561
26.9	24.270299	6.915329	181.25			26.9	27.5702	0.449175
26.7	25.177358	2.318439	182.25	JULY		26.7	27.5270	0.684003
28.4	25.134183	10.66556	183.25			28.4	27.4839	0.839213
23.5	25.090146	2.528563	184.25			23.5	27.4408	15.53011
25.5	25.045249	0.206799	185.25			25.5	27.3978	3.601623
26.9	24.999496	3.611915	186.25			26.9	27.3548	0.206871
25.5	24.952892	0.299328	187.25			25.5	27.3119	3.283163
25.1	24.905438	0.037854	188.25			25.1	27.2692	4.705273
25.5	24.85714	0.413269	189.25			25.5	27.2265	2.980755
26.3	24.807998	2.22607	190.25			26.3	27.1839	0.781331
26.7	24.758016	3.7713	191.25			26.7	27.1415	0.194928
24.5	24.707197	0.042931	192.25			24.5	27.0992	6.756003
24.9	24.655543	0.059759	193.25			24.9	27.0571	4.653148
26.2	24.603056	2.550229	194.25			26.2	27.0152	0.664507
26.9	24.549739	5.523726	195.25			26.9	26.9734	0.00539
25.5	24.495594	1.008832	196.25			25.5	26.9319	2.050212
26.1	24.440622	2.753536	197.25			26.1	26.8905	0.624903
26	24.384826	2.608786	198.25			26	26.8494	0.721451
24.8	24.328209	0.222587	199.25			24.8	26.8085	4.034049
25.6	24.270771	1.76685	200.25			25.6	26.7679	1.363883
27	24.212516	7.770069	201.25			27	26.7275	0.07427
25.9	24.153445	3.050455	202.25			25.9	26.6874	0.619948
25.2	24.093561	1.224208	203.25			25.2	26.6475	2.095392
26.4	24.032866	5.603326	204.25			26.4	26.6080	0.043274
26.9	23.971362	8.576921	205.25			26.9	26.5688	0.109687
25.2	23.909053	1.666545	206.25			25.2	26.5299	1.768679
25.8	23.84594	3.818349	207.25			25.8	26.4914	0.477976
25.9	23.782028	4.485806	208.25			25.9	26.4531	0.305968
26.8	23.717319	9.502925	209.25			26.8	26.4153	0.148005
25.9	23.651816	5.054332	210.25			25.9	26.3778	0.22829
26.3	23.585523	7.368384	211.25			26.3	26.3407	0.001655
25.9	23.518445	5.671804	212.25			25.9	26.3040	0.163191
24.9	25.160687	0.067958	213.25	AUGUST		24.9	26.2677	1.870474
26.1	25.101392	0.997219	214.25			26.1	26.2317	0.017358
25.6	25.041784	0.311606	215.25			25.6	26.1963	0.355538
23.5	24.98187	2.195939	216.25			23.5	26.1612	7.082126
25.2	24.921657	0.077475	217.25			25.2	26.1266	0.858639
26.4	24.861151	2.368055	218.25			26.4	26.0925	0.094565

25.8	24.800359	0.999283	219.25			25.8	26.0588	0.066983
24.3	24.739286	0.192972	220.25			24.3	26.0256	2.977733
25.8	24.677938	1.259022	221.25			25.8	25.9929	0.03721
25.3	24.616324	0.467413	222.25			25.3	25.9607	0.436503
23.9	24.554447	0.428302	223.25			23.9	25.9290	4.116742
25	24.492317	0.257742	224.25			25	25.8978	0.806016
26	24.429938	2.465094	225.25			26	25.8671	0.017658
25	24.367318	0.400286	226.25			25	25.8370	0.700547
25.8	24.304464	2.236627	227.25			25.8	25.8074	5.48E-05
23.4	24.241384	0.707926	228.25			23.4	25.7784	5.65663
25.3	24.178083	1.258697	229.25			25.3	25.7499	0.202407
25.6	24.114571	2.206499	230.25			25.6	25.7220	0.014883
26.2	24.050855	4.618825	231.25			26.2	25.6947	0.255352
26.2	23.986943	4.897622	232.25			26.2	25.6679	0.283084
24.9	23.922843	0.954835	233.25			24.9	25.6418	0.550277
23.5	23.858565	0.128569	234.25			23.5	25.6163	4.478613
25	23.794118	1.454152	235.25			25	25.5914	0.349697
24.3	23.72951	0.325459	236.25			24.3	25.5670	1.605416
24.4	23.664752	0.54059	237.25			24.4	25.5434	1.307305
25.9	23.599854	5.290673	238.25			25.9	25.5203	0.144147
26.5	23.534826	8.792256	239.25			26.5	25.4979	1.00414
26.1	23.46968	6.918582	240.25			26.1	25.4762	0.389153
25.3	23.404427	3.593196	241.25			25.3	25.4551	0.02405
24.9	23.33908	2.436472	242.25			24.9	25.4346	0.285842
25.9	23.27365	6.897717	243.25			25.9	25.4149	0.23535
24.7	25.160865	0.212396	244.25	SEPTEMBER		24.7	25.3958	0.484099
26.3	25.102386	1.434278	245.25			26.3	25.3774	0.851277
26.9	25.044236	3.443859	246.25			26.9	25.3596	2.372777
27.3	24.986421	5.352647	247.25			27.3	25.3426	3.831521
26.7	24.928949	3.136623	248.25			26.7	25.3262	1.887264
27.1	24.871826	4.96476	249.25			27.1	25.3106	3.202051
27	24.81506	4.773962	250.25			27	25.2956	2.904887
26.7	24.758659	3.768804	251.25			26.7	25.2814	2.012452
25.1	24.702631	0.157902	252.25			25.1	25.2679	0.02818
26.6	24.646985	3.814269	253.25			26.6	25.2551	1.808854
27.1	24.591727	6.291432	254.25			27.1	25.2430	3.448522
24.5	24.536869	0.001359	255.25			24.5	25.2316	0.535272
25.2	24.482417	0.514925	256.25			25.2	25.2210	0.000441
26.5	24.428383	4.291595	257.25			26.5	25.2111	1.661272
26.3	24.374776	3.706486	258.25			26.3	25.2019	1.205747
26.5	24.321606	4.745399	259.25			26.5	25.1935	1.706915
24.6	24.268884	0.109638	260.25			24.6	25.1858	0.343193
25.9	24.216621	2.833766	261.25			25.9	25.1789	0.520005
28.8	24.164827	21.48483	262.25			28.8	25.1727	13.15738
26.9	24.113516	7.764493	263.25			26.9	25.1672	3.002455
24.4	24.062699	0.113772	264.25			24.4	25.1625	0.581467
26	24.012389	3.950598	265.25			26	25.1586	0.707973
25.1	23.962599	1.293681	266.25			25.1	25.1554	0.003068
26.5	23.913343	6.690793	267.25			26.5	25.1529	1.814569
25.9	23.864636	4.142707	268.25			25.9	25.1512	0.560634
25.4	23.816491	2.5075	269.25			25.4	25.1503	0.062348
27	23.768925	10.43985	270.25			27	25.1501	3.422075
24.8	23.721952	1.162188	271.25			24.8	25.1507	0.122977
24.3	23.67559	0.389888	272.25			24.3	25.1520	0.725902
26.4	23.629854	7.673708	273.25			26.4	25.1541	1.55234
25.5	25.177068	0.104285	274.25	OCTOBER		25.5	25.1569	0.117721

26.4	25.135327	1.599399	275.25			26.4	25.1605	1.536434
27.5	25.094446	5.786692	276.25			27.5	25.1648	5.453175
27.4	25.05443	5.501696	277.25			27.4	25.1699	4.973472
25.7	25.015287	0.468831	278.25			25.7	25.1757	0.274896
25.7	24.977023	0.522696	279.25			25.7	25.1823	0.268051
24.6	24.939643	0.115357	280.25			24.6	25.1896	0.3476
25.2	24.903155	0.088117	281.25			25.2	25.1976	5.62E-06
25.3	24.867566	0.186999	282.25			25.3	25.2064	0.008757
26	24.832884	1.36216	283.25			26	25.2160	0.614729
25.3	24.799118	0.250883	284.25			25.3	25.2262	0.005444
26.1	24.766275	1.778822	285.25			26.1	25.2372	0.744406
26.4	24.734365	2.774339	286.25			26.4	25.2489	1.324959
28.1	24.703398	11.5369	287.25			28.1	25.2614	8.057787
28.2	24.673383	12.43703	288.25			28.2	25.2745	8.558316
26.2	24.644331	2.420107	289.25			26.2	25.2884	0.830978
27.3	24.616252	7.202505	290.25			27.3	25.3030	3.987964
28.2	24.589157	13.03818	291.25			28.2	25.3183	8.304139
26.4	24.56306	3.37435	292.25			26.4	25.3343	1.135694
25.6	24.53797	1.127907	293.25			25.6	25.3510	0.061997
26.2	24.513903	2.842924	294.25			26.2	25.3684	0.691559
27.3	24.490869	7.891216	295.25			27.3	25.3865	3.661568
26.7	24.468884	4.977879	296.25			26.7	25.4052	1.676411
27.5	24.447961	9.314943	297.25			27.5	25.4247	4.306984
25.6	24.428115	1.373316	298.25			25.6	25.4448	0.024094
26.5	24.40936	4.370775	299.25			26.5	25.4655	1.070093
27.4	24.391713	9.04979	300.25			27.4	25.4870	3.659668
28.2	24.37519	14.62917	301.25			28.2	25.5091	7.241202
28.2	24.359806	14.74709	302.25			28.2	25.5318	7.11943
27.6	24.34558	10.59125	303.25			27.6	25.5551	4.181479
28.4	24.332528	16.54433	304.25			28.4	25.5791	7.957346
27.6	25.205722	5.732569	305.25	NOVEMBER		27.6	25.6037	3.98507
27.5	25.192943	5.322512	306.25			27.5	25.6290	3.500776
27.6	25.181331	5.849959	307.25			27.6	25.6548	3.783803
26.5	25.170889	1.766536	308.25			26.5	25.6812	0.670375
25	25.161619	0.026121	309.25			25	25.7083	0.501637
27.2	25.153526	4.188056	310.25			27.2	25.7359	2.143663
28.4	25.146613	10.58453	311.25			28.4	25.7641	6.948175
28.2	25.140883	9.358195	312.25			28.2	25.7928	5.794545
27.9	25.136343	7.637799	313.25			27.9	25.8221	4.317565
27.4	25.132997	5.139302	314.25			27.4	25.8520	2.396351
27.5	25.130851	5.612869	315.25			27.5	25.8824	2.616681
27.2	25.12991	4.285274	316.25			27.2	25.9133	1.65556
26.5	25.130181	1.876404	317.25			26.5	25.9448	0.308285
26	25.131671	0.753995	318.25			26	25.9767	0.000542
27.3	25.134387	4.68988	319.25			27.3	26.0092	1.666181
26.9	25.138336	3.103459	320.25			26.9	26.0422	0.735906
28.5	25.143527	11.26591	321.25			28.5	26.0756	5.87777
27.6	25.149968	6.002654	322.25			27.6	26.1095	2.221593
27.5	25.157668	5.486518	323.25			27.5	26.1439	1.839087
27	25.166636	3.361224	324.25			27	26.1787	0.674545
26.5	25.176881	1.750644	325.25			26.5	26.2140	0.081821
27	25.188413	3.281847	326.25			27	26.2496	0.563027
27.4	25.201243	4.834534	327.25			27.4	26.2858	1.241531
27.1	25.21538	3.551791	328.25			27.1	26.3223	0.60485
26.9	25.230837	2.786105	329.25			26.9	26.3592	0.292471
28.5	25.247624	10.57795	330.25			28.5	26.3965	4.424734

28.1	25.265752	8.032961		331.25		28.1	26.4342	2.774991
27.9	25.285234	6.837001		332.25		27.9	26.4722	2.038593
27.9	25.306081	6.728414		333.25		27.9	26.5106	1.930446
28.3	25.328307	8.830961		334.25		28.3	26.5493	3.064873
26.5	25.23734	1.594311		335.25	DECEMBER	26.5	26.5884	0.00781
27.8	25.256162	6.47111		336.25		27.8	26.6277	1.374177
28.5	25.276131	10.39333		337.25		28.5	26.6674	3.358346
26.6	25.297245	1.69717		338.25		26.6	26.7074	0.011532
26.7	25.319504	1.905768		339.25		26.7	26.7476	0.002269
27.5	25.342908	4.653046		340.25		27.5	26.7881	0.506742
28.9	25.367456	12.47887		341.25		28.9	26.8289	4.289421
27.5	25.39315	4.438818		342.25		27.5	26.8699	0.397005
28.4	25.419989	8.880463		343.25		28.4	26.9112	2.21666
28.5	25.447976	9.314849		344.25		28.5	26.9526	2.394415
28.1	25.477112	6.879543		345.25		28.1	26.9943	1.222639
28.9	25.507398	11.50975		346.25		28.9	27.0361	3.474042
28.1	25.538836	6.559561		347.25		28.1	27.0782	1.044172
27.8	25.571429	4.966527		348.25		27.8	27.1203	0.461924
28.3	25.60518	7.262054		349.25		28.3	27.1627	1.29345
30	25.640091	19.0088		350.25		30	27.2052	7.810952
29.6	25.676166	15.39648		351.25		29.6	27.2478	5.532794
28.9	25.713407	10.15438		352.25		28.9	27.2905	2.590348
27.6	25.751818	3.415777		353.25		27.6	27.3334	0.071087
28.9	25.791403	9.663374		354.25		28.9	27.3763	2.321652
28.4	25.832166	6.593772		355.25		28.4	27.4193	0.961768
27.5	25.87411	2.643517		356.25		27.5	27.4624	0.001416
27.5	25.917241	2.505127		357.25		27.5	27.5055	3E-05
27.3	25.961561	1.791419		358.25		27.3	27.5486	0.061813
26.5	26.007076	0.242974		359.25		26.5	27.5918	1.19201
25.7	26.053789	0.125167		360.25		25.7	27.6350	3.744118
26	26.101706	0.010344		361.25		26	27.6781	2.816184
26.8	26.15083	0.421421		362.25		26.8	27.7213	0.848811
26.8	26.201167	0.358601		363.25		26.8	27.7644	0.930144
26.7	26.25272	0.200059		364.25		26.7	27.8075	1.226618
27.1	26.305495	0.631238		365.25		27.1	27.8506	0.56334
25.7	25.264945	0.189273	1996	1	JAN.	25.7	27.5537	3.436357
27.1	25.311033	3.200402		2		27.1	27.5967	0.24674
28.6	25.357925	10.51105		3		28.6	27.6397	0.922192
28.4	25.405615	8.966344		4		28.4	27.6826	0.514642
28.8	25.454099	11.19505		5		28.8	27.7255	1.154582
27.9	25.503375	5.743814		6		27.9	27.7683	0.017347
28.5	25.553437	8.682235		7		28.5	27.8110	0.474698
28	25.604282	5.739462		8		28	27.8537	0.021418
28.5	25.655908	8.088858		9		28.5	27.8962	0.364595
27.6	25.708311	3.578489		10		27.6	27.9386	0.114647
25.6	25.761487	0.026078		11		25.6	27.9809	5.668586
26.5	25.815433	0.468632		12		26.5	28.0230	2.319587
27.5	25.870147	2.656421		13		27.5	28.0650	0.319228
27	25.925626	1.15428		14		27	28.1068	1.225045
27.4	25.981866	2.011103		15		27.4	28.1485	0.560179
28.1	26.038866	4.248274		16		28.1	28.1899	0.00808
27.5	26.096621	1.969471		17		27.5	28.2311	0.53454
27.4	26.15513	1.549701		18		27.4	28.2721	0.760619
26.5	26.214389	0.081573		19		26.5	28.3129	3.286664
28.1	26.274396	3.33283		20		28.1	28.3535	0.064238
30	26.335147	13.43115		21		30	28.3937	2.580097

29.5	26.396639	9.630852	22			29.5	28.4337	1.136904
29.8	26.458868	11.16316	23			29.8	28.4735	1.759675
29.5	26.521832	8.869484	24			29.5	28.5129	0.974349
28.1	26.585527	2.293629	25			28.1	28.5520	0.20434
29.4	26.649948	7.562785	26			29.4	28.5909	0.654717
30.1	26.715092	11.4576	27			30.1	28.6293	2.162844
31.6	26.780955	23.22319	28			31.6	28.6675	8.599655
30.4	26.847531	12.62003	29			30.4	28.7053	2.872093
30.3	26.914817	11.45946	30			30.3	28.7427	2.425174
29.6	26.982806	6.849703	31			29.6	28.7798	0.672801
29.7	25.279616	19.5398	32	FEB.		29.7	28.8164	0.78071
30.8	25.339804	29.81374	33			30.8	28.8527	3.792015
29.2	25.400222	14.43831	34			29.2	28.8885	0.097001
30	25.460864	20.60375	35			30	28.9240	1.157798
30.2	25.521724	21.88626	36			30.2	28.9590	1.540083
31.3	25.582795	32.68643	37			31.3	28.9936	5.31963
29.3	25.64407	13.36582	38			29.3	29.0277	0.074156
30	25.705543	18.44236	39			30	29.0613	0.881085
30.5	25.767207	22.39933	40			30.5	29.0945	1.975371
31.3	25.829056	29.93123	41			31.3	29.1272	4.720969
30.6	25.891082	22.17391	42			30.6	29.1594	2.075247
30.2	25.953278	18.03465	43			30.2	29.1911	1.017812
29.7	26.015638	13.57452	44			29.7	29.2223	0.228172
29.7	26.078154	13.11777	45			29.7	29.2530	0.19981
31	26.140818	23.61165	46			31	29.2831	2.947608
30.9	26.203623	22.05596	47			30.9	29.3127	2.51939
31.1	26.266561	23.36213	48			31.1	29.3418	3.091289
29.8	26.329624	12.04351	49			29.8	29.3703	0.184652
29.5	26.392803	9.654676	50			29.5	29.3982	0.01036
29.2	26.456089	7.52905	51			29.2	29.4256	0.050882
29.9	26.519473	11.42796	52			29.9	29.4523	0.200399
30.8	26.582946	17.78354	53			30.8	29.4785	1.746313
30.9	26.646498	18.09228	54			30.9	29.5041	1.948542
31.6	26.710119	23.91093	55			31.6	29.5291	4.288751
31.1	26.773798	18.71602	56			31.1	29.5534	2.391887
31.6	26.837525	22.68117	57			31.6	29.5772	4.091873
31.4	26.901287	20.23842	58			31.4	29.6003	3.239036
31.7	26.965073	22.41953	59			31.7	29.6227	4.315022
31.2	26.981022	17.79978	59.25			31.2	29.6283	2.470386
31.1	25.278088	33.89466	60.25	MAR		31.1	29.6499	2.102739
31.5	25.336164	37.99287	61.25			31.5	29.6709	3.345498
31	25.393887	31.4285	62.25			31	29.6913	1.712737
31.7	25.451249	39.04688	63.25			31.7	29.7110	3.956224
31.2	25.508244	32.39608	64.25			31.2	29.7300	2.160918
31	25.564865	29.54069	65.25			31	29.7483	1.566659
31.5	25.621103	34.56143	66.25			31.5	29.7660	3.006757
32.2	25.676951	42.55016	67.25			32.2	29.7830	5.84201
31.4	25.732402	32.12167	68.25			31.4	29.7993	2.562375
31.8	25.787446	36.15081	69.25			31.8	29.8148	3.940845
31.3	25.842075	29.78894	70.25			31.3	29.8297	2.1617
30.3	25.896281	19.39274	71.25			30.3	29.8439	0.208022
31.2	25.950054	27.56193	72.25			31.2	29.8574	1.802648
31.5	26.003385	30.21278	73.25			31.5	29.8701	2.656493
32.2	26.056263	37.7455	74.25			32.2	29.3822	5.372389
32	26.108679	34.70766	75.25			32	29.8935	4.43747
31.9	26.160622	32.94046	76.25			31.9	29.9041	3.983797

31.8	26.21208	31.22485	77.25			31.8	29.9139	3.557331
32.2	26.263043	35.24746	78.25			32.2	29.9230	5.184567
31.5	26.313498	26.89981	79.25			31.5	29.9314	2.460427
31.3	26.363433	24.3697	80.25			31.3	29.9391	1.852111
32.3	26.412835	34.65872	81.25			32.3	29.9460	5.541365
32.3	26.461691	34.08586	82.25			32.3	29.9522	5.512352
30.3	26.509986	14.3642	83.25			30.3	29.9576	0.117247
31.4	26.557708	23.44779	84.25			31.4	29.9623	2.067071
32.9	26.60484	39.62904	85.25			32.9	29.9662	8.607161
33.3	26.651368	44.20431	86.25			33.3	29.9694	11.09296
33.1	26.697276	40.99488	87.25			33.1	29.9718	9.785457
33.4	26.742546	44.32169	88.25			33.4	29.9735	11.74079
31.3	26.787163	20.36569	89.25			31.3	29.9745	1.75707
32.3	26.831109	29.90877	90.25			32.3	29.9746	5.407287
31.8	25.260509	42.76495	91.25	APRIL		31.8	29.9741	3.333985
32.8	25.300465	56.24303	92.25			32.8	29.9728	7.99325
32.8	25.339528	55.65864	93.25			32.8	29.9707	8.00492
32.7	25.377694	53.61617	94.25			32.7	29.9679	7.464421
32.8	25.414956	54.53888	95.25			32.8	29.9643	8.041026
31.7	25.451308	39.04615	96.25			31.7	29.9600	3.027526
31.6	25.486744	37.3719	97.25			31.6	29.9550	2.706134
31.8	25.521256	39.42262	98.25			31.8	29.9492	3.42558
28.3	25.554838	7.535913	99.25			28.3	29.9426	2.69822
30.8	25.587482	27.17034	100.25			30.8	29.9353	0.747631
30.7	25.61918	25.81473	101.25			30.7	29.9273	0.597031
29.5	25.649923	14.82309	102.25			29.5	29.9186	0.175197
31.2	25.679702	30.47369	103.25			31.2	29.9091	1.666489
31.5	25.708509	33.54137	104.25			31.5	29.8989	2.563671
31.6	25.736333	34.3826	105.25			31.6	29.8879	2.931271
30.2	25.763163	19.68552	106.25			30.2	29.8762	0.104826
30.6	25.78899	23.14582	107.25			30.6	29.8638	0.541934
32.3	25.813802	42.07076	108.25			32.3	29.8507	5.998932
27.6	25.837588	3.106097	109.25			27.6	29.8369	5.003746
28.9	25.860335	9.239565	110.25			28.9	29.8224	0.850774
32.8	25.882031	47.8583	111.25			32.8	29.8071	8.95722
32.4	25.902662	42.2154	112.25			32.4	29.7912	6.80582
32.6	25.922216	44.5928	113.25			32.6	29.7746	7.983035
31.9	25.940678	35.51352	114.25			31.9	29.7573	4.59136
32.7	25.958034	45.4541	115.25			32.7	29.7393	8.766037
32	25.974269	36.30943	116.25			32	29.7206	5.19581
29.4	25.989368	11.63241	117.25			29.4	29.7012	0.090729
29.4	26.003314	11.53748	118.25			29.4	29.6812	0.079068
28.1	26.016091	4.342676	119.25			28.1	29.6605	2.435178
29.8	26.027683	14.23038	120.25			29.8	29.6392	0.025867
30.6	25.232307	28.81213	121.25	MAY		30.6	29.6172	0.965936
28.8	25.243779	12.64671	122.25			28.8	29.5946	0.631311
31.7	25.254078	41.54991	123.25			31.7	29.5713	4.531418
28.9	25.263202	13.2263	124.25			28.9	29.5474	0.419122
27.5	25.271148	4.967783	125.25			27.5	29.5229	4.092061
28.8	25.277912	12.4051	126.25			28.8	29.4978	0.486869
29.7	25.283492	19.50555	127.25			29.7	29.4720	0.05197
30.4	25.287882	26.13375	128.25			30.4	29.4457	0.910683
29.2	25.291079	15.27967	129.25			29.2	29.4188	0.047867
24.8	25.293076	0.243124	130.25			24.8	29.3913	21.07993
27.2	25.29387	3.633331	131.25			27.2	29.3632	4.679511
28.3	25.293454	9.03932	132.25			28.3	29.3346	1.070361

28.8	25.291821	12.30732	133.25			28.8	29.3054	0.255421
27.7	25.288966	5.813085	134.25			27.7	29.2757	2.482689
26.3	25.284881	1.030467	135.25			26.3	29.2454	8.675264
28.5	25.279558	10.37125	136.25			28.5	29.2146	0.51062
28.4	25.272991	9.778188	137.25			28.4	29.1833	0.613488
28.4	25.26517	9.827161	138.25			28.4	29.1514	0.564637
30.2	25.256087	24.44228	139.25			30.2	29.1191	1.168363
28.9	25.245733	13.35367	140.25			28.9	29.0863	0.034697
28.7	25.234099	12.01247	141.25			28.7	29.0530	0.124587
28.4	25.221175	10.10493	142.25			28.4	29.0192	0.383406
26.2	25.206952	0.986145	143.25			26.2	28.9850	7.756044
25.6	25.191418	0.166939	144.25			25.6	28.9503	11.22443
27.6	25.174563	5.882743	145.25			27.6	28.9152	1.729672
27.9	25.156377	7.527469	146.25			27.9	28.8796	0.959663
27.2	25.136847	4.2566	147.25			27.2	28.8437	2.701622
26.9	25.115963	3.182789	148.25			26.9	28.8073	3.637763
24.1	25.093712	0.987463	149.25			24.1	28.7705	21.81383
25.9	25.070082	0.688764	150.25			25.9	28.7334	8.028046
27.9	25.045062	8.150673	151.25			27.9	28.6959	0.633394
26.8	25.199707	2.560938	152.25	JUNE		26.8	28.6580	3.452089
22.7	25.178616	6.143536	153.25			22.7	28.6197	35.04343
23.9	25.156393	1.578523	154.25			23.9	28.5812	21.91346
26.1	25.133039	0.935013	155.25			26.1	28.5423	5.964764
28	25.108556	8.360449	156.25			28	28.5031	0.253088
27.9	25.082943	7.935808	157.25			27.9	28.4636	0.317608
26.7	25.056202	2.702072	158.25			26.7	28.4238	2.97137
26.7	25.028331	2.794477	159.25			26.7	28.3837	2.834802
26.9	24.999331	3.612544	160.25			26.9	28.3433	2.083236
26.3	24.9692	1.77103	161.25			26.3	28.3027	4.01098
23.8	24.937937	1.2949	162.25			23.8	28.2619	19.90858
25.5	24.905541	0.353382	163.25			25.5	28.2208	7.402939
26.1	24.87201	1.507959	164.25			26.1	28.1795	4.324525
26.1	24.837343	1.594304	165.25			26.1	28.1381	4.15369
26.5	24.801536	2.88478	166.25			26.5	28.0964	2.548431
27.4	24.764588	6.945396	167.25			27.4	28.0545	0.428399
26.8	24.726496	4.299419	168.25			26.8	28.0125	1.470152
22.6	24.687257	4.356641	169.25			22.6	27.9703	28.84035
28.1	24.646868	11.92412	170.25			28.1	27.9280	0.029582
25.7	24.605326	1.198312	171.25			25.7	27.8856	4.776676
26.6	24.562627	4.150889	172.25			26.6	27.8430	1.545056
24.8	24.518768	0.079091	173.25			24.8	27.8003	9.002061
24.8	24.473745	0.106442	174.25			24.8	27.7576	8.747374
27.3	24.427556	8.250937	175.25			27.3	27.7148	0.172037
27.1	24.380195	7.397341	176.25			27.1	27.6719	0.327056
24	24.331659	0.109998	177.25			24	27.6290	13.16931
25.6	24.281944	1.737271	178.25			25.6	27.5860	3.944135
26	24.231047	3.129195	179.25			26	27.5430	2.380824
25	24.178963	0.674102	180.25			25	27.5000	6.249946
24.9	24.125689	0.599558	181.25			24.9	27.4570	6.538197
25.8	25.1735	0.392502	182.25	JULY		25.8	27.4140	2.605018
25.3	25.126547	0.030086	183.25			25.3	27.3711	4.289261
26.3	25.07881	1.491304	184.25			26.3	27.3281	1.057076
26.6	25.030295	2.463975	185.25			26.6	27.2853	0.469618
26.7	24.981004	2.954947	186.25			26.7	27.2425	0.294306
25.9	24.930943	0.939072	187.25			25.9	27.1998	1.689467
25.4	24.880114	0.270281	188.25			25.4	27.1572	3.087698

27.4	24.828523	6.612493	189.25			27.4	27.1147	0.081406
24.9	24.776172	0.015333	190.25			24.9	27.0723	4.718888
24	24.723065	0.522823	191.25			24	27.0301	9.181214
26.6	24.669205	3.727968	192.25			26.6	26.9879	0.150505
22.8	24.614596	3.292758	193.25			22.8	26.9460	17.18938
23.7	24.55924	0.738293	194.25			23.7	26.9042	10.26713
24.9	24.503141	0.157497	195.25			24.9	26.8627	3.851997
26.1	24.446301	2.734719	196.25			26.1	26.8213	0.520219
24	24.388725	0.151107	197.25			24	26.7801	7.728864
25.8	24.330414	2.159683	198.25			25.8	26.7391	0.881961
25.3	24.271372	1.058075	199.25			25.3	26.6984	1.955541
25.4	24.211603	1.412289	200.25			25.4	26.6579	1.582396
24.8	24.151108	0.42106	201.25			24.8	26.6177	3.304104
26	24.089893	3.648509	202.25			26	26.5778	0.333827
26.4	24.02796	5.626575	203.25			26.4	26.5381	0.019077
24.5	23.965312	0.285891	204.25			24.5	26.4988	3.995038
25.6	23.901955	2.883358	205.25			25.6	26.4597	0.739095
25.1	23.837891	1.59292	206.25			25.1	26.4210	1.744971
24.5	23.773124	0.528348	207.25			24.5	26.3826	3.544079
24.7	23.70766	0.984739	208.25			24.7	26.3445	2.704431
24.3	23.641503	0.433619	209.25			24.3	26.3068	4.0273
25.4	23.574657	3.331878	210.25			25.4	26.2695	0.755992
26.2	23.507128	7.251559	211.25			26.2	26.2325	0.001058
24.8	23.438922	1.852534	212.25			24.8	26.1960	1.948686
24.9	25.15947	0.067325	213.25	AUGUST		24.9	26.1598	1.587061
25.4	25.099063	0.090563	214.25			25.4	26.1240	0.52422
23.7	25.038452	1.791453	215.25			23.7	26.0887	5.705873
24.3	24.977642	0.459199	216.25			24.3	26.0538	3.075803
25.3	24.916641	0.146964	217.25			25.3	26.0193	0.517451
24.3	24.855454	0.308529	218.25			24.3	25.9853	2.840365
25	24.794089	0.042399	219.25			25	25.9518	0.905925
25.5	24.732553	0.588975	220.25			25.5	25.9187	0.175342
23.5	24.670851	1.370893	221.25			23.5	25.8862	5.693763
24.9	24.608992	0.084686	222.25			24.9	25.8541	0.910265
26.3	24.546981	3.073076	223.25			26.3	25.8225	0.228006
23.2	24.484826	1.650778	224.25			23.2	25.7914	6.71554
23.8	24.422535	0.387549	225.25			23.8	25.7609	3.845112
25.2	24.360114	0.705409	226.25			25.2	25.7309	0.281843
25.3	24.297572	1.004863	227.25			25.3	25.7014	0.161141
23.7	24.234915	0.286134	228.25			23.7	25.6725	3.890795
23.6	24.172154	0.32736	229.25			23.6	25.6442	4.178574
24.5	24.109295	0.152651	230.25			24.5	25.6164	1.246283
25.5	24.046347	2.113107	231.25			25.5	25.5892	0.00795
23.1	23.98332	0.780254	232.25			23.1	25.5625	6.0641
23.3	23.920223	0.384676	233.25			23.3	25.5365	5.001977
25.8	23.857065	3.774998	234.25			25.8	25.5111	0.083474
26.9	23.793856	9.64813	235.25			26.9	25.4863	1.998653
25.2	23.730607	2.159115	236.25			25.2	25.4621	0.068676
25	23.667329	1.776011	237.25			25	25.4385	0.192267
25.9	23.604033	5.271465	238.25			25.9	25.4155	0.234706
24	23.54073	0.210929	239.25			24	25.3932	1.941079
26	23.477433	6.363344	240.25			26	25.3716	0.394934
23.8	23.414154	0.148877	241.25			23.8	25.3506	2.404206
25	23.350907	2.719508	242.25			25	25.3302	0.109029
26.2	23.287704	8.481467	243.25			26.2	25.3105	0.7912
24.8	25.162635	0.131504	244.25	SEPTEMBER		24.8	25.2915	0.241559

24.9	25.106031	0.042449	245.25			24.9	25.2731	0.139235
26.4	25.049859	1.822879	246.25			26.4	25.2555	1.309925
22.9	24.994127	4.385368	247.25			22.9	25.2385	5.468606
25.4	24.938841	0.212668	248.25			25.4	25.2222	0.031605
26.1	24.884008	1.478636	249.25			26.1	25.2066	0.798099
26.3	24.829636	2.161969	250.25			26.3	25.1918	1.228214
26.2	24.775734	2.028535	251.25			26.2	25.1776	1.045354
26.8	24.722307	4.316807	252.25			26.8	25.1641	2.676145
24.1	24.669366	0.324178	253.25			24.1	25.1514	1.105347
24.8	24.616919	0.033519	254.25			24.8	25.1393	0.115139
25.6	24.564974	1.071278	255.25			25.6	25.1280	0.222774
26.9	24.513542	5.695182	256.25			26.9	25.1174	3.177574
26.1	24.462631	2.680977	257.25			26.1	25.1076	0.98492
25.4	24.412252	0.975646	258.25			25.4	25.0984	0.090936
25.9	24.362415	2.364168	259.25			25.9	25.0901	0.656011
25.3	24.313131	0.97391	260.25			25.3	25.0824	0.047349
24.5	24.264411	0.055502	261.25			24.5	25.0755	0.331189
26.3	24.216268	4.341939	262.25			26.3	25.0693	1.514574
27	24.168713	8.016189	263.25			27	25.0639	3.748511
24.2	24.121758	0.006122	264.25			24.2	25.0592	0.738244
25.8	24.075417	2.974186	265.25			25.8	25.0553	0.554613
26.9	24.029704	8.2386	266.25			26.9	25.0521	3.414773
25.4	23.984632	2.003266	267.25			25.4	25.0497	0.122744
25.6	23.940216	2.754882	268.25			25.6	25.0480	0.304745
25.6	23.896472	2.902008	269.25			25.6	25.0470	0.305781
23.7	23.853414	0.023536	270.25			23.7	25.0468	1.813971
26.4	23.811059	6.702616	271.25			26.4	25.0474	1.829526
26.6	23.769424	8.012163	272.25			26.6	25.0487	2.40649
26	23.728525	5.159599	273.25			26	25.0508	0.901025
26	25.181257	0.670341	274.25	OCTOBER		26	25.0536	0.895693
25.9	25.143776	0.571874	275.25			25.9	25.0572	0.710396
25.8	25.107229	0.479931	276.25			25.8	25.0615	0.545443
24.4	25.071621	0.451074	277.25			24.4	25.0665	0.44424
24.9	25.036956	0.018757	278.25			24.9	25.0723	0.029692
25.7	25.003241	0.485473	279.25			25.7	25.0789	0.385822
24.5	24.970482	0.221353	280.25			24.5	25.0861	0.343556
25.5	24.938686	0.315074	281.25			25.5	25.0942	0.164708
26.5	24.907859	2.534913	282.25			26.5	25.1029	1.951847
26.4	24.87801	2.316454	283.25			26.4	25.1124	1.6579
25.7	24.849146	0.723953	284.25			25.7	25.1226	0.33336
25.7	24.821275	0.772157	285.25			25.7	25.1336	0.320837
26.6	24.794407	3.260166	286.25			26.6	25.1452	2.116303
26	24.76855	1.516469	287.25			26	25.1576	0.709568
26.8	24.743714	4.22831	288.25			26.8	25.1708	2.65445
27.3	24.71991	6.656866	289.25			27.3	25.1846	4.475025
24.5	24.697147	0.038867	290.25			24.5	25.1991	0.488749
25.2	24.675437	0.275167	291.25			25.2	25.2143	0.000206
24.7	24.65479	0.002044	292.25			24.7	25.2303	0.281193
26.5	24.63522	3.477403	293.25			26.5	25.2469	1.570243
26.9	24.616739	5.213282	294.25			26.9	25.2642	2.675757
27.8	24.599358	10.24411	295.25			27.8	25.2822	6.339169
28.1	24.583093	12.36864	296.25			28.1	25.3009	7.834894
27.6	24.567955	9.193295	297.25			27.6	25.3203	5.19718
27.2	24.553961	7.001524	298.25			27.2	25.3403	3.45852
26.7	24.541123	4.660749	299.25			26.7	25.3610	1.79299
28	24.529458	12.04466	300.25			28	25.3823	6.852284

26.6	24.518982	4.330638	301.25			26.6	25.4043	1.429697
27	24.509709	6.201549	302.25			27	25.4269	2.474552
26.7	24.501657	4.832711	303.25			26.7	25.4502	1.562018
26.4	24.494843	3.629623	304.25			26.4	25.4741	0.85732
26.4	25.211224	1.413187	305.25	NOVEMBER		26.4	25.4986	0.81253
26.4	25.203969	1.43049	306.25			26.4	25.5237	0.767866
27.3	25.197901	4.418821	307.25			27.3	25.5494	3.064425
27.4	25.193021	4.870755	308.25			27.4	25.5758	3.327789
26.9	25.189333	2.926381	309.25			26.9	25.6027	1.683003
27.3	25.186839	4.465448	310.25			27.3	25.6302	2.78826
27.1	25.185543	3.665145	311.25			27.1	25.6583	2.078607
27.4	25.185448	4.904241	312.25			27.4	25.6869	2.934721
26.9	25.186558	2.935884	313.25			26.9	25.7161	1.401648
26.3	25.188878	1.234592	314.25			26.3	25.7458	0.30711
27.8	25.192413	6.799512	315.25			27.8	25.7761	4.096172
27.5	25.197167	5.303039	316.25			27.5	25.8069	2.866577
28.1	25.203148	8.391754	317.25			28.1	25.8382	5.115625
28.3	25.21036	9.545876	318.25			28.3	25.8701	5.904624
27.8	25.21881	6.662539	319.25			27.8	25.9024	3.60093
27.5	25.228506	5.159684	320.25			27.5	25.9352	2.448569
27.1	25.239455	3.461629	321.25			27.1	25.9685	1.280268
27.4	25.251663	4.615351	322.25			27.4	26.0023	1.953616
27.9	25.26514	6.942489	323.25			27.9	26.0365	3.472586
27.7	25.279893	5.85692	324.25			27.7	26.0712	2.653015
27.8	25.295931	6.270363	325.25			27.8	26.1063	2.868585
27.8	25.313263	6.183862	326.25			27.8	26.1419	2.749441
27.4	25.331898	4.277045	327.25			27.4	26.1778	1.493727
28.4	25.351847	9.291238	328.25			28.4	26.2142	4.777775
28.2	25.373118	7.991261	329.25			28.2	26.2510	3.798789
27.6	25.395723	4.858838	330.25			27.6	26.2881	1.721084
27.1	25.419671	2.823506	331.25			27.1	26.3256	0.599666
28	25.444973	6.528161	332.25			28	26.3635	2.678131
28.3	25.471641	7.999614	333.25			28.3	26.4017	3.603426
27.9	25.499685	5.761511	334.25			27.9	26.4403	2.130727
27.3	25.242619	4.232818	335.25	DECEMBER		27.3	26.4792	0.673723
26.8	25.266684	2.351059	336.25			26.8	26.5184	0.079297
27.5	25.291859	4.875889	337.25			27.5	26.5579	0.887528
28.3	25.318141	8.891481	338.25			28.3	26.5977	2.897778
28	25.345531	7.046205	339.25			28	26.6378	1.855608
27.3	25.374027	3.709373	340.25			27.3	26.6781	0.386712
27	25.403628	2.548404	341.25			27	26.7187	0.079109
27.5	25.434334	4.266976	342.25			27.5	26.7596	0.548226
27.9	25.466146	5.923647	343.25			27.9	26.8006	1.20858
28.9	25.499063	11.56637	344.25			28.9	26.8419	4.235649
28.3	25.533087	7.65581	345.25			28.3	26.8834	2.0067
28.7	25.568218	9.808062	346.25			28.7	26.9251	3.150272
28.2	25.604457	6.736843	347.25			28.2	26.9670	1.520393
27.7	25.641806	4.236161	348.25			27.7	27.0090	0.477506
28.2	25.680268	6.349051	349.25			28.2	27.0512	1.319837
28.2	25.719842	6.151182	350.25			28.2	27.0935	1.224397
28.3	25.760533	6.448894	351.25			28.3	27.1359	1.355084
28.3	25.802341	6.2383	352.25			28.3	27.1785	1.257813
28.6	25.84527	7.566539	353.25			28.6	27.2211	1.901264
27.8	25.889321	3.650693	354.25			27.8	27.2639	0.28742
25.9	25.934499	0.00119	355.25			25.9	27.3067	1.978824
26	25.980804	0.000368	356.25			26	27.3496	1.821397

28.2	26.028241	4.716536	357.25		28.2	27.3925	0.652015
28.8	26.076812	7.41575	358.25		28.8	27.4355	1.861873
26.9	26.126521	0.59827	359.25		26.9	27.4785	0.334649
27.4	26.17737	1.494824	360.25		27.4	27.5215	0.01476
27.5	26.229362	1.61452	361.25		27.5	27.5645	0.004159
27.4	26.282501	1.248804	362.25		27.4	27.6075	0.043045
27.7	26.336789	1.858345	363.25		27.7	27.6504	0.002457
27.7	26.392229	1.710265	364.25		27.7	27.6933	4.44E-05
25.8	26.448825	0.420973	365.25		25.8	27.7362	3.748844
20277	18467.166	7533.763			20277	20183.971	2065.339
27.73871	25.228369	10.30611			27.73871	27.573731	2.825361
		3.210312		Std. Dev.			1.680881
		0.004386		Std. Error			0.002296

APPENDIX 5

The Results of Forecasted Daily Mean temperature at Zaria from 1995 to 1996

DAYS	MONTH	Actual	MNTTTSM	DEV^2
1	JAN.1995	19.2	25.2043	36.05143
2		20.1	25.2239	26.2546
3		21.1	25.2436	17.16902
4		21.5	25.2632	14.16138
5		21.8	25.2827	12.12953
6		22.6	25.3023	7.302441
7		22.7	25.3218	6.873955
8		23.7	25.3413	2.693869
9		25	25.3607	0.130127
10		23.7	25.3801	2.822765
11		19.8	25.3994	31.35357
12		17	25.4187	70.87414
13		20	25.4379	29.5703
14		22.4	25.4570	9.345016
15		20.9	25.4760	20.93962
16		18.7	25.4949	46.17086
17		18.7	25.5138	46.42721
18		18.3	25.5325	52.30889
19		19.3	25.5511	39.0765
20		20.5	25.5696	25.70124
21		21.1	25.5880	20.14251
22		20.2	25.6063	29.2283
23		19.2	25.6245	41.27383
24		19.6	25.6425	36.51166
25		18.3	25.6604	54.17498
26		19.5	25.6781	38.1689
27		19.4	25.6957	39.63559
28		20.1	25.7131	31.50697
29		21.7	25.7304	16.2439
30		21.6	25.7475	17.20152
31		21.6	25.7644	17.34222
32	FEB.	22.4	25.7812	11.43218
33		22.7	25.7977	9.59587
34		21.3	25.8141	20.37713
35		20.4	25.8303	29.48809
36		19.7	25.8463	37.77686
37		20.7	25.8621	26.64708
38		20.8	25.8777	25.78271
39		21.2	25.8930	22.02465
40		22.8	25.9082	9.660923
41		25.1	25.9231	0.677562
42		26.3	25.9379	0.131148
43		27.5	25.9523	2.395249
44		24	25.9666	3.867483
45		23.1	25.9806	8.297882
46		22.8	25.9944	10.20403
47		22.1	26.0079	15.27167
48		22.4	26.0212	13.11288
49		23	26.0342	9.206305
50		23.5	26.0469	6.486947
51		22.9	26.0594	9.982094

52		23.9	26.0717	4.716174
53		23.7	26.0836	5.681717
54		22.5	26.0953	12.92634
55		23.5	26.1067	6.795041
56		24.5	26.1179	2.617464
57		25.7	26.1287	0.183785
58		26.9	26.1393	0.578729
59		27.3	26.1495	1.323599
59.25			26.1520	
60.25	MAR	27.1	26.1619	0.879956
61.25		28.4	26.1715	4.966035
62.25		27.4	26.1808	1.486354
63.25		28.1	26.1898	3.648733
64.25		28.3	26.1985	4.416203
65.25		29.3	26.2069	9.567241
66.25		28.7	26.2150	6.175357
67.25		28.6	26.2227	5.651419
68.25		28.9	26.2302	7.128005
69.25		29	26.2373	7.632576
70.25		29	26.2441	7.59505
71.25		29.4	26.2506	9.918938
72.25		28.7	26.2567	5.969627
73.25		30.3	26.2625	16.30105
74.25		30.1	26.2680	14.68391
75.25		31.1	26.2732	23.29791
76.25		31.4	26.2780	26.23442
77.25		29.3	26.2825	9.105017
78.25		29.5	26.2867	10.32519
79.25		30.1	26.2905	14.51191
80.25		30.1	26.2940	14.48529
81.25		29.2	26.2972	8.426229
82.25		28.5	26.3000	4.839902
83.25		27.5	26.3025	1.434002
84.25		27.2	26.3046	0.801669
85.25		26.6	26.3064	0.086179
86.25		29.5	26.3079	10.18954
87.25		29.3	26.3090	8.946033
88.25		30.2	26.3098	15.13382
89.25		30.2	26.3102	15.13048
90.25		31	26.3103	21.99335
91.25	APRIL	29.9	26.3100	12.88784
92.25		30.6	26.3094	18.40894
93.25		30	26.3085	13.62722
94.25		30.1	26.3072	14.38526
95.25		29.9	26.3056	12.91984
96.25		28.1	26.3036	3.227004
97.25		28.5	26.3013	4.834262
98.25		29.6	26.2987	10.89888
99.25		29.7	26.2957	11.58949
100.25		30.5	26.2923	17.70441
101.25		31	26.2887	22.19658
102.25		31.4	26.2847	26.16656
103.25		31.5	26.2803	27.24487
104.25		30.3	26.2757	16.19524
105.25		30.3	26.2707	16.23553
106.25		27.6	26.2653	1.781334

107.25		28.6	26.2597	5.477136
108.25		31.3	26.2537	25.46532
109.25		31	26.2474	22.58752
110.25		28.5	26.2407	5.104308
111.25		28.5	26.2338	5.135808
112.25		26.5	26.2265	0.074809
113.25		25.7	26.2189	0.269247
114.25		27.9	26.2110	2.852796
115.25		29.6	26.2028	11.54129
116.25		28.8	26.1942	6.790102
117.25		28.1	26.1854	3.66579
118.25		28.1	26.1762	3.700902
119.25		27.5	26.1668	1.777482
120.25		28.3	26.1570	4.592326
121.25	MAY	27.5	26.1470	1.830653
122.25		28.3	26.1366	4.680103
123.25		27.3	26.1260	1.378235
124.25		25.2	26.1151	0.837412
125.25		27	26.1039	0.802988
126.25		27.1	26.0924	1.015206
127.25		27.4	26.0807	1.74063
128.25		24.6	26.0686	2.156912
129.25		27.2	26.0563	1.307945
130.25		27.6	26.0438	2.421811
131.25		24.4	26.0310	2.660027
132.25		27.5	26.0179	2.196689
133.25		28.5	26.0045	6.227316
134.25		28.7	25.9910	7.338924
135.25		28.6	25.9771	6.879479
136.25		28.5	25.9631	6.436109
137.25		28.2	25.9487	5.068165
138.25		28.9	25.9342	8.795977
139.25		28.7	25.9194	7.731581
140.25		29.4	25.9044	12.21899
141.25		29.7	25.8892	14.52205
142.25		28	25.8738	4.520766
143.25		26.3	25.8582	0.19523
144.25		26.9	25.8423	1.118711
145.25		27	25.8263	1.377655
146.25		28.1	25.8100	5.243985
147.25		26.9	25.7936	1.224132
148.25		27.9	25.7770	4.507216
149.25		25	25.7602	0.577879
150.25		26.5	25.7432	0.572727
151.25		27.3	25.7261	2.477252
152.25	JUNE	27.7	25.7088	3.965017
153.25		26.5	25.6913	0.653997
154.25		28.8	25.6737	9.773884
155.25		25.5	25.6559	0.024308
156.25		25.2	25.6380	0.191841
157.25		27.7	25.6199	4.326625
158.25		27.9	25.6018	5.281896
159.25		25.9	25.5835	0.100203
160.25		25.5	25.5650	0.004228
161.25		27.2	25.5465	2.734155
162.25		27.7	25.5278	4.718392

163.25		26.1	25.5091	0.34922
164.25		26.7	25.4902	1.46364
165.25		27.1	25.4712	2.652874
166.25		27.1	25.4522	2.715266
167.25		27.3	25.4331	3.485427
168.25		26	25.4139	0.343547
169.25		26.5	25.3946	1.221904
170.25		24.1	25.3753	1.626313
171.25		25.2	25.3559	0.024298
172.25		24.8	25.3364	0.287763
173.25		27.9	25.3169	6.672165
174.25		26.3	25.2974	1.005173
175.25		23.9	25.2779	1.898479
176.25		25.2	25.2583	0.003394
177.25		25.7	25.2386	0.212847
178.25		24.5	25.2190	0.516982
179.25		24	25.1994	1.438496
180.25		25.7	25.1797	0.270684
181.25		24	25.1601	1.345791
182.25	JULY	24.5	25.1404	0.41017
183.25		25.9	25.1208	0.607119
184.25		25.7	25.1012	0.358541
185.25		24.3	25.0816	0.610959
186.25		25	25.0621	0.003855
187.25		25.2	25.0426	0.024781
188.25		25.1	25.0231	0.005911
189.25		24.4	25.0037	0.364449
190.25		24.8	24.9843	0.033979
191.25		26.3	24.9650	1.782139
192.25		25.8	24.9458	0.729662
193.25		25	24.9266	0.005382
194.25		26.3	24.9076	1.93891
195.25		25.4	24.8886	0.261577
196.25		25.9	24.8696	1.061632
197.25		25.7	24.8508	0.721086
198.25		28.9	24.8321	16.54764
199.25		23.5	24.8135	1.725328
200.25		23.8	24.7950	0.990078
201.25		25.5	24.7767	0.523228
202.25		24.1	24.7584	0.4335
203.25		23.8	24.7403	0.884144
204.25		25.1	24.7223	0.142652
205.25		25.1	24.7045	0.156448
206.25		24	24.6868	0.471652
207.25		24.9	24.6692	0.053257
208.25		23.3	24.6518	1.827469
209.25		24.8	24.6346	0.027352
210.25		24.6	24.6176	0.000308
211.25		25.2	24.6007	0.359192
212.25		23.6	24.5840	0.968192
213.25	AUGUST	23.6	24.5674	0.935948
214.25		25.1	24.5511	0.301282
215.25		24.3	24.5350	0.055209
216.25		21.9	24.5190	6.859275
217.25		24.3	24.5033	0.041323
218.25		25.3	24.4877	0.659757

219.25		25.2	24.4724	0.529367
220.25		23.8	24.4573	0.432069
221.25		23.8	24.4424	0.412724
222.25		25	24.4278	0.327437
223.25		24.3	24.4134	0.012849
224.25		23.7	24.3992	0.488825
225.25		25.4	24.3852	1.029804
226.25		22.6	24.3715	3.138207
227.25		24.9	24.3580	0.293724
228.25		25.3	24.3448	0.912354
229.25		25.8	24.3319	2.155394
230.25		22.9	24.3192	2.014072
231.25		24.5	24.3067	0.037346
232.25		24.4	24.2946	0.011112
233.25		24	24.2827	0.079916
234.25		23.1	24.2711	1.371423
235.25		25.3	24.2597	1.082143
236.25		23	24.2487	1.559207
237.25		23	24.2379	1.532421
238.25		25	24.2274	0.59687
239.25		25.1	24.2172	0.779275
240.25		24.7	24.2073	0.242717
241.25		21.4	24.1977	7.827336
242.25		24.6	24.1884	0.169383
243.25		25.5	24.1794	1.743871
244.25	SEPTEMBER	25.4	24.1708	1.511046
245.25		25.1	24.1624	0.879144
246.25		23.9	24.1543	0.064671
247.25		26	24.1465	3.435281
248.25		26.7	24.1391	6.558159
249.25		26.5	24.1320	5.607475
250.25		25.6	24.1252	2.175067
251.25		25.1	24.1187	0.962926
252.25		21.6	24.1126	6.312956
253.25		24.8	24.1067	0.480618
254.25		25.5	24.1012	1.956541
255.25		23.1	24.0961	0.992152
256.25		23.3	24.0912	0.626049
257.25		23.8	24.0867	0.082214
258.25		24.6	24.0826	0.267743
259.25		25	24.0787	0.848742
260.25		21.8	24.0752	5.176682
261.25		24.3	24.0721	0.05195
262.25		26.2	24.0693	4.540074
263.25		26	24.0668	3.737356
264.25		24	24.0646	0.004178
265.25		24.5	24.0628	0.19111
266.25		24.2	24.0614	0.019215
267.25		25.6	24.0603	2.37077
268.25		24.2	24.0595	0.019741
269.25		25.9	24.0591	3.389025
270.25		27	24.0590	8.649576
271.25		25.8	24.0592	3.030242
272.25		23.7	24.0598	0.129486
273.25		26	24.0608	3.76056
274.25	OCTOBER	25.6	24.0621	2.365233

275.25		25.5	24.0637	2.062971
276.25		25.4	24.0657	1.780453
277.25		25.8	24.0680	2.999918
278.25		25.4	24.0706	1.767245
279.25		24.9	24.0736	0.682919
280.25		23.2	24.0769	0.76902
281.25		25	24.0806	0.845292
282.25		26.5	24.0846	5.834141
283.25		26.3	24.0889	4.88879
284.25		26.4	24.0936	5.31944
285.25		27.2	24.0986	9.618615
286.25		26	24.1039	3.59503
287.25		25.5	24.1096	1.933196
288.25		26.3	24.1156	4.771625
289.25		26.5	24.1219	5.655311
290.25		26.1	24.1285	3.886619
291.25		26.9	24.1355	7.642407
292.25		26.2	24.1428	4.232114
293.25		26.6	24.1504	6.000603
294.25		27.1	24.1583	8.653601
295.25		26.6	24.1665	5.921802
296.25		26.1	24.1751	3.705394
297.25		26.8	24.1839	6.843965
298.25		26.6	24.1931	5.793407
299.25		25.5	24.2025	1.683506
300.25		24.9	24.2122	0.473002
301.25		25.5	24.2223	1.632533
302.25		26.3	24.2326	4.27401
303.25		26.4	24.2433	4.651527
304.25		26.4	24.2542	4.604564
305.25	NOVEMBER	25.7	24.2654	2.058153
306.25		24.8	24.2769	0.273684
307.25		25.6	24.2886	1.719752
308.25		26.3	24.3006	3.997462
309.25		26.4	24.3129	4.355855
310.25		27	24.3255	7.152981
311.25		27.3	24.3383	8.771557
312.25		26.2	24.3514	3.417319
313.25		24.4	24.3647	0.001244
314.25		24	24.3783	0.143128
315.25		25.2	24.3922	0.652616
316.25		23.8	24.4062	0.36751
317.25		20.8	24.4205	13.10828
318.25		22.3	24.4351	4.558561
319.25		22.9	24.4498	2.402034
320.25		23.1	24.4648	1.8628
321.25		23.7	24.4801	0.608491
322.25		23	24.4955	2.236481
323.25		22.5	24.5111	4.044625
324.25		22.4	24.5270	4.523997
325.25		21.8	24.5430	7.52412
326.25		22.3	24.5593	5.104222
327.25		22.5	24.5757	4.308457
328.25		21.3	24.5923	10.83923
329.25		21.5	24.6091	9.666464
330.25		21.8	24.6261	7.986643

331.25		22	24.6432	6.986539
332.25		22.4	24.6605	5.109917
333.25		22.6	24.6780	4.317994
334.25		22.1	24.6956	6.737132
335.25	DECEMBER	23.2	24.7134	2.290282
336.25		23.7	24.7313	1.06354
337.25		23	24.7493	3.060161
338.25		22.8	24.7675	3.871115
339.25		24.5	24.7858	0.081696
340.25		25	24.8043	0.038315
341.25		25.6	24.8228	0.604031
342.25		26.2	24.8415	1.845621
343.25		25	24.8602	0.019537
344.25		26.2	24.8791	1.74481
345.25		25.5	24.8980	0.362353
346.25		23	24.9171	3.675211
347.25		23.9	24.9362	1.073725
348.25		25.2	24.9554	0.059826
349.25		25	24.9747	0.000641
350.25		25.3	24.9940	0.093631
351.25		25.3	25.0134	0.08214
352.25		24.5	25.0328	0.28392
353.25		24.6	25.0523	0.204603
354.25		25.1	25.0719	0.000792
355.25		24.4	25.0914	0.478068
356.25		24.4	25.1110	0.505545
357.25		22.8	25.1306	5.431843
358.25		20.2	25.1503	24.5051
359.25		20	25.1699	26.72791
360.25		19.2	25.1896	35.87471
361.25		19.8	25.2092	29.25939
362.25		20.9	25.2288	18.73879
363.25		21.6	25.2485	13.31123
364.25		20.9	25.2681	19.07995
365.25		22.5	25.2876	7.770931
1	JAN.1996	22.9	24.9874	4.357224
2		22.8	25.0069	4.870262
3		23.8	25.0263	1.503875
4		23.7	25.0458	1.811088
5		22.7	25.0652	5.594095
6		22.7	25.0846	5.686182
7		23.1	25.1039	4.01571
8		21.6	25.1232	12.41318
9		22.7	25.1425	5.965794
10		23.3	25.1617	3.465956
11		22.7	25.1809	6.154661
12		23.7	25.1999	2.249835
13		24	25.2190	1.485865
14		23.8	25.2379	2.067556
15		24.2	25.2568	1.116735
16		22.2	25.2755	9.458857
17		21.7	25.2942	12.91828
18		21.6	25.3128	13.78471
19		23.4	25.3312	3.729716
20		24.1	25.3495	1.561518
21		24.6	25.3679	0.589595

22		25.2	25.3860	0.034586
23		23.9	25.4040	2.261919
24		24.3	25.4218	1.258502
25		25.3	25.4396	0.019475
26		25.2	25.4571	0.066117
27		25.7	25.4746	0.050821
28		25.7	25.4918	0.04333
29		24.6	25.5090	0.826203
30		25.5	25.5259	0.000671
31		26.6	25.5427	1.117901
32	FEB.	26.7	25.5593	1.301199
33		27	25.5757	2.028557
34		26.8	25.5920	1.459342
35		25.8	25.6080	0.036857
36		25.8	25.6239	0.03102
37		26.4	25.6395	0.57831
38		26.3	25.6550	0.416044
39		26.6	25.6702	0.864475
40		27.2	25.6853	2.294445
41		25.7	25.7001	4.64E-09
42		25.4	25.7147	0.099008
43		26.6	25.7290	0.758613
44		26.2	25.7431	0.208717
45		26.6	25.7570	0.710588
46		27.5	25.7707	2.99052
47		27.3	25.7841	2.297967
48		27.7	25.7973	3.620442
49		26.5	25.8102	0.475879
50		21.7	25.8228	16.99756
51		22	25.8352	14.70875
52		23.6	25.8473	5.050463
53		25.4	25.8592	0.210847
54		26.9	25.8708	1.059323
55		28.1	25.8821	4.919185
56		27.5	25.8931	2.5821
57		26.6	25.9039	0.484613
58		28.4	25.9143	6.178586
59		29	25.9245	9.458696
59.25		29.7	25.9270	14.23553
60.25	MAR	29	25.9368	9.383123
61.25		28.4	25.9463	6.020503
62.25		28.2	25.9555	5.037566
63.25		29.4	25.9645	11.8029
64.25		29.3	25.9731	11.06839
65.25		28.5	25.9814	6.343403
66.25		28.3	25.9894	5.338926
67.25		28.6	25.9971	6.775209
68.25		28.8	26.0045	7.815089
69.25		29.7	26.0115	13.60495
70.25		30	26.0183	15.85431
71.25		29.5	26.0247	12.07789
72.25		30.3	26.0308	18.22629
73.25		30.6	26.0365	20.82508
74.25		29.9	26.0420	14.88417
75.25		30	26.0471	15.62524
76.25		30.4	26.0519	18.90582

77.25		30.1	26.0564	16.35085
78.25		30.3	26.0605	17.97324
79.25		29.8	26.0643	13.95535
80.25		30.2	26.0678	17.07524
81.25		30.9	26.0709	23.3201
82.25		29.2	26.0737	9.773717
83.25		29	26.0762	8.54882
84.25		27	26.0783	0.84956
85.25		28.1	26.0801	4.080133
86.25		29.2	26.0815	9.724982
87.25		29.8	26.0826	13.81896
88.25		29	26.0834	8.506681
89.25		28.1	26.0838	4.065049
90.25		28.7	26.0839	6.84404
91.25	APRIL	28.4	26.0836	5.365554
92.25		28.1	26.0830	4.068133
93.25		29.7	26.0821	13.08917
94.25		30.6	26.0808	20.4229
95.25		30.9	26.0792	23.23994
96.25		30.5	26.0773	19.56058
97.25		30	26.0750	15.40581
98.25		30.8	26.0724	22.35067
99.25		29.3	26.0694	10.43686
100.25		30.5	26.0661	19.65957
101.25		30.3	26.0625	17.95678
102.25		28.5	26.0585	5.960974
103.25		29.1	26.0542	9.276954
104.25		30.1	26.0496	16.40605
105.25		31	26.0446	24.55597
106.25		31	26.0393	24.60839
107.25		29.9	26.0337	14.94826
108.25		31.8	26.0278	33.31871
109.25		30.5	26.0215	20.05693
110.25		30.6	26.0149	21.02294
111.25		31.8	26.0080	33.54702
112.25		31.3	26.0008	28.08148
113.25		29.5	25.9933	12.29714
114.25		30.9	25.9854	24.15302
115.25		31.5	25.9773	30.50051
116.25		31.1	25.9688	26.3291
117.25		28.9	25.9600	8.643339
118.25		26.8	25.9510	0.720842
119.25		29.2	25.9416	10.61712
120.25		30.2	25.9319	18.21632
121.25	MAY	30.7	25.9220	22.82944
122.25		30.1	25.9117	17.54157
123.25		31.1	25.9012	27.02754
124.25		30.3	25.8904	19.44478
125.25		26.5	25.8793	0.3853
126.25		26.7	25.8679	0.692398
127.25		28.7	25.8562	8.086962
128.25		29.4	25.8443	12.64288
129.25		28.1	25.8321	5.143253
130.25		24.9	25.8197	0.845795
131.25		27.8	25.8070	3.972219
132.25		30.2	25.7940	19.41294

133.25		28	25.7808	4.924996
134.25		26.8	25.7673	1.066474
135.25		26.7	25.7536	0.8957
136.25		28.2	25.7396	6.053401
137.25		27.5	25.7254	3.149037
138.25		27.8	25.7110	4.363796
139.25		28.6	25.6964	8.430973
140.25		25.9	25.6815	0.047733
141.25		27.1	25.6664	2.055102
142.25		27.5	25.6511	3.418277
143.25		26.8	25.6356	1.35574
144.25		26.8	25.6199	1.392564
145.25		28.2	25.6040	6.739089
146.25		27.7	25.5879	4.460862
147.25		26.8	25.5716	1.508878
148.25		27.5	25.5552	3.782388
149.25		24.1	25.5385	2.069318
150.25		25.5	25.5217	0.00047
151.25		26.2	25.5047	0.483451
152.25	JUNE	24.5	25.4875	0.975227
153.25		22.4	25.4702	9.426253
154.25		24.1	25.4528	1.829937
155.25		25.7	25.4351	0.070153
156.25		27	25.4174	2.504696
157.25		26.2	25.3995	0.64083
158.25		26.6	25.3815	1.484854
159.25		26.3	25.3633	0.877404
160.25		25.9	25.3450	0.307994
161.25		24.3	25.3266	1.053989
162.25		22.6	25.3081	7.334034
163.25		24.4	25.2895	0.791283
164.25		26.1	25.2708	0.687503
165.25		24.7	25.2521	0.30476
166.25		25.7	25.2332	0.217928
167.25		26.8	25.2142	2.514718
168.25		26.8	25.1952	2.575447
169.25		27.2	25.1761	4.096265
170.25		27.6	25.1569	5.968686
171.25		26.7	25.1377	2.440823
172.25		26.5	25.1184	1.908789
173.25		24.3	25.0991	0.638544
174.25		24.8	25.0797	0.078248
175.25		26.5	25.0603	2.072643
176.25		26.3	25.0409	1.585311
177.25		24.3	25.0215	0.520508
178.25		24.8	25.0020	0.040804
179.25		26.3	24.9825	1.735733
180.25		26.7	24.9631	3.016993
181.25		23.5	24.9436	2.083909
182.25	JULY	25	24.9241	0.00576
183.25		25.1	24.9047	0.038161
184.25		26.3	24.8852	2.001612
185.25		24.7	24.8658	0.027492
186.25		24.6	24.8464	0.060726
187.25		26.2	24.8271	1.884897
188.25		25.5	24.8078	0.479161

189.25		25.2	24.7885	0.169304
190.25		24.1	24.7693	0.448014
191.25		23.7	24.7502	1.102927
192.25		25.4	24.7311	0.447381
193.25		24.9	24.7121	0.035292
194.25		23.6	24.6932	1.195126
195.25		24.5	24.6744	0.030409
196.25		25.1	24.6556	0.197459
197.25		24.6	24.6370	0.001368
198.25		24.9	24.6184	0.079278
199.25		25	24.6000	0.160006
200.25		23.8	24.5817	0.610993
201.25		22.3	24.5634	5.123191
202.25		24.7	24.5454	0.023915
203.25		24.7	24.5274	0.029793
204.25		24.5	24.5096	9.15E-05
205.25		24.8	24.4919	0.094939
206.25		24.5	24.4743	0.000659
207.25		23.8	24.4569	0.431573
208.25		23.8	24.4397	0.409223
209.25		22	24.4226	5.869131
210.25		23.9	24.4057	0.255752
211.25		25	24.3890	0.373346
212.25		24.4	24.3724	0.000761
213.25	AUGUST	24	24.3560	0.126762
214.25		25.1	24.3398	0.577841
215.25		22.8	24.3238	2.322083
216.25		24	24.3080	0.094883
217.25		23.9	24.2924	0.153997
218.25		23.5	24.2770	0.603767
219.25		24.8	24.2618	0.289622
220.25		25.7	24.2469	2.111618
221.25		22.5	24.2321	3.000184
222.25		24.4	24.2176	0.03328
223.25		25.6	24.2033	1.950854
224.25		22.4	24.1892	3.201238
225.25		24	24.1754	0.030754
226.25		23.1	24.1618	1.12737
227.25		23.3	24.1484	0.719836
228.25		23.6	24.1353	0.286584
229.25		22.5	24.1225	2.632485
230.25		23.3	24.1099	0.655952
231.25		23.4	24.0976	0.486625
232.25		23.4	24.0855	0.469947
233.25		23.7	24.0737	0.13968
234.25		25.1	24.0622	1.076986
235.25		26.2	24.0510	4.61829
236.25		24.7	24.0400	0.435577
237.25		23.4	24.0293	0.396066
238.25		23.1	24.0189	0.844459
239.25		24.2	24.0088	0.036542
240.25		26.1	23.9990	4.414082
241.25		22.9	23.9895	1.187035
242.25		23.7	23.9803	0.078564
243.25		24.9	23.9714	0.862346
244.25	SEPTEMBER	23.2	23.9628	0.581802

245.25		24.5	23.9545	0.297623
246.25		24.9	23.9465	0.909255
247.25		21	23.9388	8.636328
248.25		24.1	23.9314	0.02843
249.25		25.8	23.9243	3.518143
250.25		26.1	23.9176	4.762925
251.25		25.5	23.9112	2.524394
252.25		25.8	23.9051	3.590774
253.25		23.9	23.8993	5.03E-07
254.25		24.5	23.8938	0.36743
255.25		25.5	23.8887	2.596233
256.25		24.9	23.8839	1.032413
257.25		24.8	23.8795	0.847397
258.25		23.1	23.8753	0.60113
259.25		23.8	23.8715	0.005116
260.25		24.1	23.8681	0.053796
261.25		24.6	23.8649	0.540329
262.25		25.2	23.8621	1.789884
263.25		26.2	23.8597	5.477114
264.25		24.4	23.8576	0.294245
265.25		25.8	23.8558	3.780015
266.25		25.3	23.8543	2.089961
267.25		24.9	23.8532	1.095735
268.25		24.8	23.8525	0.897829
269.25		23.9	23.8520	0.0023
270.25		26.7	23.8520	8.11138
271.25		25.7	23.8522	3.414341
272.25		24.7	23.8528	0.717746
273.25		24.6	23.8537	0.55691
274.25	OCTOBER	25.6	23.8550	3.044991
275.25		25.7	23.8566	3.39804
276.25		26.6	23.8586	7.515417
277.25		25.2	23.8609	1.793287
278.25		25.3	23.8635	2.063561
279.25		26.3	23.8665	5.922152
280.25		24.5	23.8698	0.397213
281.25		25.4	23.8734	2.330556
282.25		26.9	23.8774	9.136409
283.25		25.7	23.8816	3.3064
284.25		24.6	23.8863	0.509398
285.25		24.6	23.8912	0.502344
286.25		22.8	23.8965	1.202366
287.25		24.4	23.9021	0.247867
288.25		25.6	23.9081	2.862608
289.25		25.9	23.9143	3.94286
290.25		25.6	23.9209	2.819316
291.25		25.8	23.9278	3.505062
292.25		26.6	23.9350	7.102032
293.25		25.3	23.9426	1.842621
294.25		25.2	23.9504	1.561468
295.25		24.8	23.9586	0.708009
296.25		24.5	23.9670	0.284058
297.25		24.6	23.9758	0.389631
298.25		25.9	23.9849	3.667744
299.25		25	23.9942	1.011568
300.25		24.3	24.0039	0.087677

301.25		24.5	24.0139	0.236336
302.25		22.7	24.0241	1.753255
303.25		21.9	24.0346	4.556697
304.25		22	24.0455	4.18392
305.25	NOVEMBER	21.6	24.0566	6.034712
306.25		21.5	24.0679	6.59434
307.25		21.9	24.0796	4.75065
308.25		22.1	24.0915	3.966163
309.25		22.6	24.1037	2.261156
310.25		22.8	24.1162	1.7323
311.25		21.5	24.1289	6.911024
312.25		21.7	24.1419	5.962642
313.25		20.8	24.1551	11.25652
314.25		21.1	24.1685	9.41595
315.25		21.9	24.1823	5.208685
316.25		23.1	24.1962	1.201667
317.25		23.2	24.2104	1.020893
318.25		22.6	24.2248	2.640008
319.25		22.3	24.2395	3.761481
320.25		22.3	24.2543	3.819365
321.25		22.6	24.2694	2.786905
322.25		22.4	24.2847	3.552088
323.25		22.8	24.3002	2.250607
324.25		23.5	24.3159	0.665709
325.25		22.9	24.3318	2.050096
326.25		22.6	24.3479	3.055208
327.25		24.1	24.3642	0.069804
328.25		23.9	24.3807	0.23105
329.25		22.9	24.3973	2.24199
330.25		22.4	24.4142	4.056812
331.25		22.3	24.4311	4.541786
332.25		22.1	24.4483	5.514532
333.25		23.1	24.4656	1.864917
334.25		23.1	24.4831	1.912933
335.25	DECEMBER	23.7	24.5007	0.641128
336.25		24.1	24.5185	0.175111
337.25		23.5	24.5364	1.074039
338.25		22.2	24.5544	5.543132
339.25		22.5	24.5725	4.295416
340.25		22.1	24.5908	6.204145
341.25		22.7	24.6092	3.645046
342.25		23.4	24.6277	1.507242
343.25		23.8	24.6463	0.716222
344.25		24.4	24.6650	0.070224
345.25		24.1	24.6838	0.34081
346.25		23.8	24.7027	0.814809
347.25		23.3	24.7216	2.021021
348.25		22.8	24.7407	3.766162
349.25		23.4	24.7598	1.848956
350.25		23.1	24.7789	2.818804
351.25		23.1	24.7982	2.883725
352.25		21.7	24.8174	9.718365
353.25		22	24.8368	8.047155
354.25		21.2	24.8561	13.36716
355.25		21.4	24.8755	12.07915
356.25		21.3	24.8949	12.92353

357.25		22.1	24.9144	7.92072
358.25		21.7	24.9338	10.45772
359.25		22.2	24.9533	7.580729
360.25		21.6	24.9728	11.37571
361.25		22.9	24.9923	4.377573
362.25		24.5	25.0117	0.261871
363.25		22.8	25.0312	4.9782
364.25		21.5	25.0506	12.60693
366.25		22.3	25.0700	7.673088
		18557.4	18357.92	4367.521
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