King **F**ahd **U**niversity for **P**etroleum and **M**inerals
Department of Mathematics & Statistics
Term 172 Quiz#2 (chap 3) STAT 460 (1)

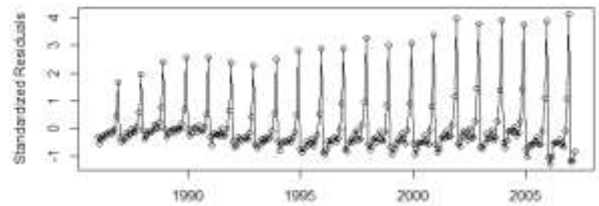
Full Name: ID# **Ser#**

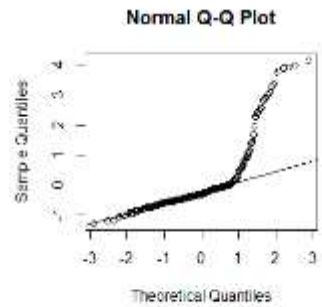
Q1. The UK retail sales from Jan 1986 to Mar 2007 was analyzed.
Using the following **partial summary and residual plots,**

	Estimate	**Std. Error**	***t* value**	***Pr*(>|*t*|)**
Intercept	-7334.9763	307.0736	-23.89	<2e-16 ***
time(retail)		0.1538	24.17	<2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 15.07 on 253 degrees of freedom
Multiple R-squared: 0.6978, Adjusted R-squared: 0.6966
F-statistic: 584.1 on 1 and 253 DF, *p*-value: < 2.2e-16





a) Write the time series **model** that was used in the analysis.
b) Describe any **remaining patterns** in the data that should be modeled.
c) Should you use the **random cosine** model for this data? Why or why not?

Q2. Suppose that a **stationary** time series $\{Y_t\}$, has an autocorrelation of $\rho_k = 0.35^k$ for k =1,2,…..

a) Compute $Var(\bar{Y})$
(Hint: For $|\lambda| < 1$, $\sum_{k=0}^{n} \lambda^k = \frac{1-\lambda^{k+1}}{1-\lambda}$ and $\sum_{k=0}^{n} k\lambda^{k-1} = \frac{d}{d\lambda}[\sum_{k=0}^{n} \lambda^k]$)
b) For large n, compare the **precision** of this series with the series $Y_t = \mu + e_t$, where e_t is zero-mean white noise process.