1 -Consider the following 3 models that a researcher suggests might be a reasonable model of stock market prices

Yt = Yt -1 +Ut

Yt = 0.5 Yt -1 + Ut

Yt = 0.8 Yt -1 + Ut

1. What classes of models are these examples of ?
2. What would the autocorrelation function for each of these processes look like ? (only consider the shape no calculation necessary)
3. Which model is more likely to represent stock market prices from a theoretical perspective , and why ? if any of the three models truly represented the way stock market prices move, which could potentially be used to make money by forecasting future values of the series?
4. By making a series of successive substitutions or from your knowledge of the behavior of these types of processes ,consider the extent of persistence of shocks in the series in each case

2 - What are the differences between autoregressive and moving average models

**Question 1**

1. Consider a series that follows an MA(1) with zero mean and a moving average coefficient of 0.4. What is the value of the autocorrelation function at lag 1?

|  |  |  |
| --- | --- | --- |
|  |  | 0.4 |
|  |  | 1 |
|  |  | 0.34 |
|  |  | It is not possible to determine the value of the autocovariances without knowing the disturbance variance. |

**Question 2**

1. Which of the following sets of characteristics would usually best describe an autoregressive process of order 3 (i.e. an AR(3))?

|  |  |  |
| --- | --- | --- |
|  |  | A slowly decaying acf, and a pacf with 3 significant spikes |
|  |  | A slowly decaying pacf and an acf with 3 significant spikes |
|  |  | A slowly decaying acf and pacf |
|  |  | An acf and a pacf with 3 significant spikes |

**Question 3**

1. Which of the following is not required for a series to be covariance stationary?

|  |  |  |
| --- | --- | --- |
|  |  | *E( yt )=μ* for all *t* |
|  |  | *E( yt - μ )( yt - μ )= σ2 < ∞* |
|  |  | *E( yr - μ )( ys - μ )= χr-s for all r, s*  |
|  |  | *yt* has a normal distribution for all t.  |

**Question 4**

1. Which of the following is not true about the Q test?

|  |  |  |
| --- | --- | --- |
|  |  | The statistic Q has a normal distribution under the null hypothesis.  |
|  |  | Q uses the sample size.  |
|  |  | Q has a χ2 distribution  |
|  |  | Q is inferior to Q\*.  |

**Question 5**

1. A process, *χt*, which has a constant mean and variance, and zero autocovariance for all non-zero lags is best described as

|  |  |  |
| --- | --- | --- |
|  |  | A white noise process  |
|  |  | A covariance stationary process  |
|  |  | An autocorrelated process  |
|  |  | A moving average process  |