

1. An investor purchases 100 shares of XYZ at the beginning of the year for \$35. The stock pays a cash dividend of \$3 per share. The price of the stock at the time of the dividend is \$30. The dividend is not reinvested. The stock is sold at the end of the year for \$28.

Calculate the holding period return for this investment. It is approximately

- A. -20.0%
 - B. -12.6%
 - C. -11.4%
 - D. -10.3%
2. A fundamental assumption of the random walk hypothesis of market returns is that returns from one time period to the next are statistically independent. This assumption implies
 - A. Returns from one time period to the next can never be equal.
 - B. Returns from one time period to the next are uncorrelated.
 - C. Knowledge of the returns from one time period does not help in predicting returns from the next time period.
 - D. Both b and c are true.
 3. Consider a stock with daily returns that follow a random walk. The annualized volatility is 34%. Estimate the weekly volatility of this stock assuming that the year has 52 weeks.
 - A. 6.80%
 - B. 5.83%
 - C. 4.85%
 - D. 4.71%
 4. You are given that X and Y are random variables each of which follows a standard normal distribution with a covariance (X,Y) , of 0.6. What is the variance of $(3X + 4Y)$?
 - A. 39.4
 - B. 37.5
 - C. 35
 - D. 36.3
 5. For a lognormal variable X, we know that $\ln(X)$ has a normal distribution with a mean of 0 and a standard deviation of 0.5. What are the expected value and the variance of X?
 - A. 1.133 and 0.365
 - B. 1.126 and 0.217
 - C. 1.025 and 0.187
 - D. 1.203 and 0.399

6. Paul Graham, FRM® is analyzing the sales growth of a baby product launched three years ago by a regional company. He assesses that three factors contribute heavily towards the growth and comes up with the following results: $Y = b + 1.5 X_1 + 1.2 X_2 + 3 X_3$ Sum of Squared Regression [SSR] = 869.76 Sum of Squared Errors [SEE] = 22.12 Determine what proportion of sales growth is explained by the regression results.

- A. 0.98
- B. 0.36
- C. 0.55
- D. 0.64

7. The result of the linear regression is: $Y = 0.10 - 0.50 X$ with a correlation coefficient $R = (-0.90)$.

The fraction of the variance of Y attributable to X is equal to:

- A. (-0.90)
- B. (+0.81)
- C. (+0.90)
- D. (-0.50)

8. Which of the following statements regarding linear regression is FALSE?

- A. unconditional heteroskedasticity leads to inefficient estimates, whereas conditional Heteroskedasticity can lead to problems with both inference and estimation.
- B. multicollinearity occurs when a high correlation exists between or among two or more of the independent variables in a multiple regression.
- C. serial correlation occurs when the residual terms are correlated with each other.
- D. Heteroskedasticity occurs when the variance of residuals is not the same across all observations in the sample.

9. You regress the returns of a global industrial company's stock against the returns for the MSCI EAFE index and determine the following information:

$$R_{\text{stock}} = 0.04 + 1.2X + e ;$$

$$s_{\text{company stock}} = 6.6\%$$

$$s_{\text{MSCI EAFE}} = 4.8\%$$

$$\text{covariance of returns} = 0.002765.$$

The coefficient of determination for the regression equation is closest to:

- A. 0.873
- B. 1.200
- C. 0.762
- D. 0.040

10. Under what circumstances could the explanatory power of regression analysis be overstated?
- A. The explanatory variables are not correlated with one another.
 - B. The variance of the error term decreases as the value of the dependent variable increases.
 - C. The error term is normally distributed.
 - D. An important explanatory variable is omitted that influences the explanatory variables included, and the dependent variable.
11. Illiquid positions will create
- A. Zero autocorrelation in returns
 - B. An overstatement of the systematic risk measure
 - C. Positive autocorrelation in returns
 - D. Negative autocorrelation in returns
12. It has been observed that daily returns on spot positions of the euro against the U.S. dollar are highly correlated with returns on spot holdings of the Japanese yen against the dollar. This implies that
- A. When the euro strengthens against the dollar, the yen also tends to strengthen against the dollar. The two sets of returns are not necessarily equal.
 - B. The two sets of returns tend to be almost equal.
 - C. The two sets of returns tend to be almost equal in magnitude but opposite in sign.
 - D. None of the above is true.
13. Consider a portfolio with 40% invested in asset X and 60% invested in asset Y. The mean and variance of return on X are 0 and 25 respectively. The mean and variance of return on Y are 1 and 121 respectively. The correlation coefficient between X and Y is 0.3; what is the nearest value for portfolio volatility.
- A. 7.45%
 - B. 13.38%
 - C. 9.51%
 - D. 8.60%
14. You are given the following information about the returns of stock P and stock Q:
1. Variance of return of stock P=100.0
 2. Variance of return of stock Q=225.0

3. Covariance between the return of stock P and the return of stock Q=53.2

At the end of 1999, you are holding USD 1 million in stock P. you are considering a strategy of shifting USD 1 million into stock Q and keeping USD 3 million in stock P. What percentage of risk is reduced?

- A. 9.50%
- B. 5.00%
- C. 7.40%
- D. 0.50%

15. Let X and Y be two random variables representing the annual returns of two different portfolios.

If $E(X)=3$, $E(Y)=4$ and $E(XY)=11$, then what is $Cov(X, Y)$?

- A. -1
- B. 0
- C. 12
- D. 11

16. Given that x and y are random variables, and a, b, c, and d are constant, which one of the following definitions is wrong

- A. $Var(ax + by + c) = Var(ax + by) + c$, if x and y are correlated.
- B. $Var(x - y) = Var(x + y) = Var(x) + Var(y)$, if x and y are uncorrelated.
- C. $Cov(ax + by, cx + dy) = acVar(x) + bdVar(y) + (ad + bc)Cov(x,y)$, if x and y are correlated.
- D. $E(ax + by + c) = aE(x) + bE(y) + c$, if x and y are correlated.

17. What is kurtosis? What is its role in statistical distributions?

- A. Kurtosis can be seen in the second and fourth moments of a distribution and measures the standard deviation of a distribution
- B. Kurtosis can be verified in the four initial moments of a distribution and measures the mean of a distribution.
- C. The kurtosis represents the 3rd moment of a distribution. A small kurtosis indicates flatness in the middle of the distribution. A population with low kurtosis is usually called leptokurtic. Skewness (and not kurtosis) plays an important role in distinguishing those distributions that place additional probability on larger values
- D. The kurtosis measures the nature of the spread of the values around the mean. It represents the 4th moment of a distribution. A small kurtosis indicates a sharp peak in the middle of a distribution. A population with high kurtosis is usually called leptokurtic. The kurtosis plays an important role in distinguishing those distributions that place additional probability on larger values

18. If X(t) follows a lognormal process then the correlation between X(t) and 1/X(t) is:

- A. -1
 - B. 1
 - C. $\frac{1}{2}$
 - D. $-\frac{1}{2}$
19. Positive autocorrelation in prices can be defined as:
- A. A downward movement in price is more than likely to be followed by another downward movement in price.
 - B. An upward movement in price is more than likely to be followed by another upward movement in price.
 - C. A downward movement in price is more than likely to be followed by another downward movement in price. An upward movement in price is more than likely to be followed by another upward movement in price.
 - D. Historic prices have no correlation with futures prices.
20. Consider the following estimated linear regression model:
- $Y = 0.08 - 0.5X + e$, $R^2 = \text{coefficient of determination} = 0.64$. You also know that the standard deviation of the independent variable is 0.4, and the variance of the dependent variable is 0.09.
- What is $\text{cov}(X, Y)$?
- A. 0.0768
 - B. 0.0288
 - C. 0.096
 - D. 0.01152