

Q1. On a multiple choice exam with four choices for each of six questions, what is the probability that a student gets less than two questions correct simply by guessing?

- a. 0.46%
- b. 23.73%
- c. 35.60%
- d. 53.39%

Q2. Given two random variables X and Y, what is the Variance of X given $\text{Variance}[Y] = 100$, $\text{Variance}[4X - 3Y] = 2,700$ and the correlation between X and Y is 0.5?

- a. 56.3
- b. 113.3
- c. 159.9
- d. 225.0

Q3. Assume the marginal monthly default rates (conditional on no previous default) for a firm are 2% each month during the first year and 3% each month during the second year. What is the marginal probability of defaulting over the second year, conditional on not having defaulted the first year?

- a. Insufficient information to answer the question
- b. 30.6%
- c. 36.0%
- d. 47.4%

Q4. Let X be a uniformly distributed random variable between minus one and one so that the standard deviation of X is 0.577. What percentage of the distributions will be less than 1.96 standard deviations above the mean?

- a. 100%
- b. 97.5%
- c. 95%
- d. Insufficient information provided.

Q5. 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 $\text{Cov}(XY)$?

- a. -1
- b. 0
- c. 11
- d. 12

Q6. A bright quantitative analyst in your risk management department has developed a new risk measure that promises to be applicable to a wide set of risks across your firm. As a first step in your evaluation, You ask the analyst to demonstrate that it is a coherent risk measure. The results are listed below. Which equation shows that it is not a coherent risk measure?

Given:

- X and Y are state-contingent payoffs of two different portfolios.
- $P(X)$ and $p(Y)$ are the risk measures of the two portfolios respectively.
- a and b are arbitrary constants (with $a > 0$)
- r is the risk free rate
 - a. $p(x+y) \geq p(x) + p(y)$
 - b. $p(ax) = ap(x)$
 - c. $p(x) \leq p(y)$ if $x < y$
 - d. $p(x+b(1+r)) = p(x)-b$

Q7. You are given the following information about the returns of stock P and stock Q:

- Variance of return of stock P=100.0
- Variance of return of stock Q=225.0
- 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, as measured by standard deviation of return, can be reduced by this strategy?

- a. 0.50%
- b. 5.00%
- c. 7.40%
- d. 9.70%

Q8. Consider an A rated bond and a BBB rated bonds. Assume the one year probabilities of default for the A and BBB rated bonds are 2% & 4%., respectively, and that the joint probabilities of default of the two bonds is 0.15%. what is the default correlation between the two bonds?

- a. a. 0.07%
- b. b. 2.6%
- c. c. 93%
- d. d. the default correlation cannot be calculated with the information provided.

Q9. For a zero coupon bond the probability of defaulting over the next year is 0.4% and the average (annualized) probability of defaulting over the next two years is 0.6%. What is the marginal probability of default during the second year assuming risk neutral pricing?

- a. 0.18%
- b. 0.33%
- c. 0.80%
- d. 0.90%

Q10. Consider 3 random variables: X, Y, Z. suppose $\text{corr}(X, Y)=0.4$ and $\text{corr}(Y,Z)=0.3$, which of the following statement is true?

- a. $\text{Corr}(X, Z)$ cannot be 0
- b. $\text{Corr}(X, Z)$ has to be larger than 0.3
- c. $\text{Corr}(X, Z)$ cannot be negative
- d. none of the above