25/03 600 FINANCIAL DATA

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FD Graded Quiz M2

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QUESTIONS

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Question 1

Given a symmetric matrix:

$$A = \begin{pmatrix} 4 & 2 \\ 2 & 5 \end{pmatrix}$$

is it positive definite?

- ○ No, because its determinant is negative
- ○ Yes, because its determinant is positive (16) and all eigenvalues are positive
- ○ Cannot be determined from the given information
- ◉ No, because it has a zero eigenvalue

Question 2

How does semivariance improve upon variance when measuring risk?

- ○ By assuming returns are normally distributed
- ○ By considering only upside deviations emphasizing potential gains
- ◉ By focusing only on downside deviations providing a measure of downside risk
- ○ By including both skewness and kurtosis in its calculation

Question 3

Suppose A is a symmetric n×n matrix, and x is a non-zero n-dimensional vector. Define the Rayleigh quotient R(A,x) = (x^T Ax) / (x^T x). Which of the following statements is true?

- ◉ If A is positive definite, then R(A,x) > 0 for all non-zero x
- ○ If R(A,x) >= 0 for all non-zero x, then A is necessarily positive definite
- ○ If A is positive semidefinite, then the minimum value of R(A,x) over all unit vectors x is equal to the largest eigenvalue of A
- ○ If A is positive definite, then the maximum value of R(A,x) over all unit vectors x is equal to the trace of A

Question 4

Calculate the Sharpe Ratio given a portfolio return of 12% risk-free rate of 2% and standard deviation of portfolio returns of 20%.

- ○ 0.833
- ◉ 0.5
- ○ 0.6
- ○ 0.666

Question 5

Given a stock with daily log returns having a mean of 0.001 and standard deviation of 0.02, what is the probability of observing a daily return exceeding 0.04 assuming normal distribution?

- ○ 4.79%
- ◉ 2.56%
- ○ 5.12%
- ○ 3.08%

Question 6

According to the notes, what are the three distinct approaches to measuring and comparing investment volatility?

- (●) High-low metric, moving average rolling distance, and standard deviation of returns
- ( ) Beta, alpha, and standard deviation
- ( ) Range, median, and mode of returns
- ( ) Variance, covariance, and correlation

Question 7

How can Benford's Law be applied to detect accounting manipulation?

- ( ) By tracking changes in account balances
- ( ) By monitoring unusual transactions
- (●) By analyzing the frequency distribution of first digits in financial data
- ( ) By comparing transaction volumes across periods

Question 8

Given a symmetric matrix

$$A = \begin{pmatrix} 2 & 1 & 0 \\ 1 & 3 & 1 \\ 0 & 1 & 2 \end{pmatrix}$$

what is l22 in its Cholesky factorization?

- ( ) sqrt(4 + 4) = 2sqrt(2)
- (●) sqrt(3-(1/2)) = 1.58
- ( ) sqrt(4) = 2
- ( ) 4

Question 9

If an asset's returns exhibit high positive skewness what can be inferred about the distribution of its returns compared to a normal distribution?

- ( ) The mean median and mode of the distribution are all equal
- ( ) The distribution has a longer left tail indicating potential for extreme negative returns
- (●) The distribution has a longer right tail indicating potential for extreme positive returns
- ( ) The distribution is symmetrical with no skewness

Question 10

What is the determinant of an upper triangular matrix?

- ( ) Always zero
- ( ) The product of all its non-zero elements
- (●) The product of its diagonal elements
- ( ) The sum of its diagonal elements

Question 11

If a stock has daily log returns with mean 0.0005 and standard deviation 0.02, what is the approximate 3-sigma upper bound?

- ( ) 0.0805
- ( ) 0.0405
- (●) 0.0605
- ( ) 0.0205

Question 12

Using the compound interest formula shown in the notes, what would be the future value of a $5,000 investment after 3 years with an annual interest rate of 8%

- (●) $6,288.26
- ( ) $7,298.46
- ( ) $6,298.56
- ( ) $6,398.36

Question 13

Which of the following best explains why indices typically show lower volatility than individual stocks?

- ( ) Individual stocks are more frequently traded
- ( ) Indices are managed by professional fund managers
- ( ) Indices are protected by government regulations
- (●) Diversification across multiple stocks reduces overall portfolio volatility

Question 14

According to the notes, what was Ernst & Young employees' ethical violation that led to regulatory action?

- (●) Cheating on their ethics exam
- ( ) Insider trading
- ( ) Falsifying client documents
- ( ) Misreporting financial statements

Question 15

Which of the following matrices is symmetric positive definite?

- (●) $A = \begin{pmatrix} 2 & 1 \\ 1 & 1 \end{pmatrix}$
- ( ) $A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$
- ( ) $A = \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$
- ( ) $A = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

Question 16

In the Jarque-Bera test for normality, what does a p-value of 0.0 indicate?

- ( ) Perfect normal distribution
- ( ) Inconclusive evidence
- ( ) No skewness or kurtosis
- (●) Strong evidence against normal distribution

SUBMIT