

# PRMIA

## 8007 Exam

### Mathematical Foundations of Risk Measurement



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### Question: 1

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Suppose 60% of capital is invested in asset 1, with volatility 40% and the rest is invested in asset 2, with volatility 30%. If the two asset returns have a correlation of -0.5, what is the volatility of the portfolio?

- A. 36%
- B. 36.33%
- C. 26.33%
- D. 20.78%

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**Answer: D**

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### Question: 2

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Concerning a standard normal distribution and a Student's t distribution (with more than four degrees of freedom), which of the following is true?

- A. The distributions have the same kurtosis.
- B. The normal distribution has higher kurtosis than the t distribution.
- C. The normal distribution has lower kurtosis than the t distribution.
- D. Which has the higher kurtosis depends on the degrees of freedom of the t distribution.

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**Answer: C**

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### Question: 3

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You work for a brokerage firm that charges its client  $x$  per share. The volume of trade of a client of type A depends on the per share commission in the following manner. If the commission is  $x$ , the client of type A will trade  $e^{-ax}$  shares on average each week. What is the optimal commission  $x$  that maximizes the income from client A, noting that  $a$  is greater than zero?

- A. 1
- B.  $a$
- C.  $4a$
- D.  $a^2$

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**Answer: C**

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**Question: 4**

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If the annual volatility of returns is 25% what is the variance of the quarterly returns?

- A. 0.1250
- B. 0.0156
- C. 0.0625
- D. None of the above

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**Answer: B**

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**Question: 5**

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You are to perform a simple linear regression using the dependent variable  $Y$  and the independent variable  $X$  ( $Y = a + bX$ ). Suppose that  $\text{cov}(X,Y)=10$ ,  $\text{var}(X)= 5$ , and that the mean of  $X$  is 1 and the mean of  $Y$  is 2. What are the values for the regression parameters  $a$  and  $b$ ?

- A.  $b=0.5$ ,  $a=2.5$
- B.  $b=0.5$ ,  $a=1.5$
- C.  $b=2$ ,  $a=4$
- D.  $b=2$ ,  $a=0$

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**Answer: D**

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