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**Shared by Kaufman on 29-01-2024**

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## Question 1

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**Question Type:** MultipleChoice

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An operational risk analyst models the occurrence of computer failures as a Poisson process with an arrival rate of 2 events per year. According to this model, what is the probability of zero failures in one year?

**Options:**

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A- 0.02

B- 0.14

C- 0.25

D- 0.50

**Answer:**

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B

## Question 2

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**Question Type:** MultipleChoice

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Let  $f(x) = c$  for  $x$  in  $[0,4]$  and 0 for other values of  $x$ .

What is the value of the constant  $c$  that makes  $f(x)$  a probability density function; and what if  $f(x) = cx$  for  $x$  in  $[0,4]$ ?

**Options:**

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A- 1/4 and 1/7

B- 1/7 and 1/9

C- 1/4 and 1/6

D- None of the above

**Answer:**

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D

## Question 3

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**Question Type: MultipleChoice**

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An asset price  $S$  is lognormally distributed if:

**Options:**

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- A- the change in price ( $dS$ ) is normally distributed
- B-  $1/S$  is normally distributed
- C-  $\ln(dS/S)$  is normally distributed
- D-  $\ln(1+dS/S)$  is normally distributed

**Answer:**

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D

## Question 4

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**Question Type: MultipleChoice**

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Assume that 40% of all financial organizations investigated by authorities turn out to be fraudulent.

What is the probability of randomly investigating 2 different organizations and finding that neither is fraudulent; and what is the probability of finding exactly one being fraudulent?

**Options:**

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- A-  $2/5$  and  $1/2$
- B-  $2/5$  and  $3/5$
- C-  $1/3$  and  $8/17$
- D-  $9/25$  and  $12/25$

**Answer:**

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D

## Question 5

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**Question Type:** MultipleChoice

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In a portfolio there are 7 bonds: 2 AAA Corporate bonds, 2 AAA Agency bonds, 1 AA Corporate and 2 AA Agency bonds. By an unexplained characteristic the probability of any specific AAA bond outperforming the others is twice the probability of any specific AA bond outperforming the others. What is the probability that an AA bond or a Corporate bond outperforms all of the others?

**Options:**

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A-  $5/7$

**B-** 8/11

**C-** 6/11

**D-** None of these

**Answer:**

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D

## Question 6

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**Question Type:** MultipleChoice

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Your stockbroker randomly recommends stocks to his clients from a tip sheet he is given each day. Today, his tip sheet has 3 common stocks and 5 preferred stocks from Asian companies and 3 common stocks and 5 preferred stocks from European companies. What is the probability that he will recommend a common stock AND/OR a European stock to you when you call and ask for one stock to buy today?

**Options:**

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**A-** 11/16

B-  $7/8$

C-  $9/16$

D- None of these

**Answer:**

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A

## Question 7

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**Question Type:** MultipleChoice

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A biased coin has a probability of getting heads equal to 0.3. If the coin is tossed 4 times, what is the probability of getting heads at least two times?

**Options:**

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A- 0.7367

B- 0.3483

C- 0.2646

D- None of these

**Answer:**

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B

## Question 8

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**Question Type: MultipleChoice**

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What is the probability of tossing a coin and getting exactly 2 heads out of 5 throws?

**Options:**

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A-  $8/15$

B-  $9/23$

C-  $10/32$

D- None of these

**Answer:**

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C

## Question 9

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**Question Type:** MultipleChoice

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A quadratic form is

### Options:

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- A-** defined as a positive definite Hessian matrix.
- B-** an algebraic expression in two variables,  $x$  and  $y$ , involving  $x^2$ ,  $xy$ , and  $y^2$  terms.
- C-** a specific solution of the Black-Scholes pricing formula
- D-** an algebraic expression in two variables,  $x$  and  $y$ , involving  $x$ ,  $y$ , and terms.

### Answer:

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B

## Question 10

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**Question Type: MultipleChoice**

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I have a portfolio of two stocks. The weights are equal. The one volatility is 30% while the other is 40%. The minimum and maximum possible values of the volatility of my portfolio are:

**Options:**

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- A- 30% and 40%
- B- 5% and 35%
- C- 10% and 40%
- D- 10% and 70%

**Answer:**

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B

## Question 11

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**Question Type: MultipleChoice**

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Suppose I trade an option and I wish to hedge that option for delta and vega. Another option is available to trade. To complete the hedge I would

**Options:**

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- A-** trade the underlying in such a way as to make the portfolio delta and vega neutral.
- B-** trade the other option in such a way as to make the portfolio delta and vega neutral.
- C-** trade the other option in such a way as to make the portfolio vega neutral, and then trade the underlying in such a way as to make the portfolio delta neutral.
- D-** trade the underlying in such a way as to make the portfolio delta neutral, and then trade the other option in such a way as to make the portfolio vega neutral.

**Answer:**

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C

## Question 12

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**Question Type:** MultipleChoice

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Suppose we perform a principle component analysis of the correlation matrix of the returns of 13 yields along the yield curve. The largest eigenvalue of the correlation matrix is 9.8. What percentage of return volatility is explained by the first component? (You may use the fact that the sum of the diagonal elements of a square matrix is always equal to the sum of its eigenvalues.)

**Options:**

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A- 64%

B- 75%

C- 98%

D- Cannot be determined without estimates of the volatilities of the individual returns

**Answer:**

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B

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