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Question 1

Question Type: MultipleChoice

The Lagrangian of a constrained optimisation problem is given by $L(x,y,\lambda) = 16x+8x^2+4y-(4x+y-20)\lambda$, where λ is the Lagrange multiplier. What is the solution for x and y ?

Options:

- A- $x = -1, y = 0$
- B- $x = 0, y = 20$
- C- $x = 5, y = 0$
- D- None of the above

Answer:

B

Question 2

Question Type: MultipleChoice

What is the indefinite integral of the function $f(x) = \ln(x)$, where $\ln(x)$ denotes the natural logarithmic function?

Options:

A- $x \ln(x) - x$

B- $\ln(x) - x$

C- $1/x$

D- $\exp(x)$

Answer:

A

Question 3

Question Type: MultipleChoice

What is the total derivative of the function $f(x,y) = \ln(x+y)$, where $\ln()$ denotes the natural logarithmic function?

Options:

A- $1 / (x+y)$

B- $(x + y) / (x+y)$

C- $-x/(x+y) - y/(x+y)$

D- $\ln(x+y) x + \ln(x+y) y$

Answer:

B

Question 4

Question Type: MultipleChoice

Suppose that $f(x)$ and $g(x,y)$ are functions. What is the partial derivative of $f(g(x,y))$ with respect to y ?

Options:

A- $f'(g(x,y))$

B- $f(dg/dy)$

C- $f(g(x,y)) dg/dy$

D- $f'(g(x,y)) dg/dy$

Answer:

D

Question 5

Question Type: MultipleChoice

You are given the following values of a quadratic function $f(x)$: $f(0)=0$, $f(1)=-2$, $f(2)=-5$. On the basis of these data, the derivative $f'(0)$ is ...

Options:

A- in the interval $] -2.5, -2[$

B- equal to -2

C- in the interval $] -2, +[$

D- in the interval $] -, -2.5]$

Answer:

C

Question 6

Question Type: MultipleChoice

An underlying asset price is at 100, its annual volatility is 25% and the risk free interest rate is 5%. A European put option has a strike of 105 and a maturity of 90 days. Its Black-Scholes price is 7.11. The options sensitivities are: delta = -0.59; gamma = 0.03; vega = 19.29. Find the delta-gamma approximation to the new option price when the underlying asset price changes to 105

Options:

A- 6.49

B- 5.03

C- 4.59

D- 4.54

Answer:

D

Question 7

Question Type: MultipleChoice

An underlying asset price is at 100, its annual volatility is 25% and the risk free interest rate is 5%. A European call option has a strike of 85 and a maturity of 40 days. Its Black-Scholes price is 15.52. The options sensitivities are: delta = 0.98; gamma = 0.006 and vega = 1.55. What is the delta-gamma-vega approximation to the new option price when the underlying asset price changes to 105 and the volatility changes to 28%?

Options:

- A- 17.33
- B- 18.75
- C- 19.23
- D- 20.54

Answer:

D

Question 8

Question Type: MultipleChoice

A bond has modified duration 6 and convexity 30. Find the duration-convexity approximation to the percentage change in bond price when its yield increases by 5 basis points

Options:

A- 10 basis point rise

B- 24 basis fall

C- 24 basis point rise

D- 30 basis points fall.

Answer:

D

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