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Question 1

Question Type: MultipleChoice

In a 2-step binomial tree, at each step the underlying price can move up by a factor of u = 1.1 or down by a factor of d = 1/u. The continuously compounded risk free interest rate over each time step is 1% and there are no dividends paid on the underlying. Use the Cox, Ross, Rubinstein parameterization to find the risk neutral probability and hence find the value of a European put option with strike 102, given that the underlying price is currently 100.

Options:

A- 5.19

B- 5.66

C- 6.31

D- 4.18

Answer:

C

Question 2

Question Type: MultipleChoice

A 2-step binomial tree is used to value an American put option with strike 105, given that the underlying price is currently 100. At each step the underlying price can move up by 10 or down by 10 and the risk-neutral probability of an up move is 0.6. There are no dividends paid on the underlying and the continuously compounded risk free interest rate over each time step is 1%. What is the value of the option in this model?

Options:

A- 7.12

B- 6.59

C- 7.44

D- 7.29

Answer:

A

Question 3

Question Type: MultipleChoice

In a binomial tree lattice, at each step the underlying price can move up by a factor of u = 1.1 or down by a factor of . The continuously compounded risk free interest rate over each time step is 1% and there are no dividends paid on the underlying. The risk neutral probability for an up move is:

Options:

A- 0.5290

B- 0.5292

C- 0.5286

D- 0.5288

Answer:

D

Question 4

Question Type: MultipleChoice

A 2-step binomial tree is used to value an American put option with strike 104, given that the underlying price is currently 100. At each step the underlying price can move up by 20% or down by 20% and the risk-neutral probability of an up move is 0.55. There are no

dividends paid on the underlying and the discretely compounded risk free interest rate over each time step is 2%. What is the value of the option in this model?

Options:

A- 11.82

B- 12.33

C- 12.49

D- 12.78

Answer:

C

Question 5

Question Type: **MultipleChoice**

Variance reduction is:

Options:

A- A technique that is applied in regression models to improve the accuracy of the coefficient estimates

B- A numerical method for finding portfolio weights to minimize the variance of a portfolio that has a given expected return

C- A numerical method for finding the variance of the underlying that is implicit in a market price of an option

D- A method for reducing the number of simulations required in a Monte Carlo simulation

Answer:

D

Question 6

Question Type: **MultipleChoice**

The gradient of a function f(x, y, z) = x + y2 - x y z at the point x = y = z = 1 is

Options:

A- (0, 2, 1)

B- (0, 0, 0)

C- (1, 1, 1)

D- (0, 1, -1)

Answer:

D

Question 7

Question Type: **MultipleChoice**

The Newton-Raphson method

Options:

A- is based on finding a middle point between left and right end of the search interval

B- is based on Taylor series and uses the first derivative

C- can be used for continuous but not differentiable functions

D- does provide an error bound along with every iteration

Answer:

B

Question 8

Question Type: MultipleChoice

What is a Hessian?

Options:

A- Correlation matrix of market indices

B- The vector of partial derivatives of a contingent claim

C- A matrix of second derivatives of a function

D- The point at which a minimum of a multidimensional function is achieved

Answer:

C

Question 9

Question Type: MultipleChoice

The bisection method can be used for solving f(x)=0 for a unique solution of x, when

Options:

A- The function f(x) is continuous and monotonic

B- The function f(x) is differentiable

C- The function f(x) is differentiable and we have an explicit expression for the derivative

D- The function f(x) is continuous

Answer:

A

Question 10

Question Type: MultipleChoice

When calculating the implied volatility from an option price we use the bisection method and know initially that the volatility is somewhere between 1% and 100%. How many iterations do we need in order to determine the implied volatility with accuracy of 0.1%?

Options:

A- 10

B- 100

C- 25

D- 5

Answer:

A

Question 11

Question Type: **MultipleChoice**

An option has value 10 when the underlying price is 99 and value 9.5 when the underlying price is 101. Approximate the value of the option delta using a first order central finite difference.

Options:

A- -4

B- 0.25

C- -0.5

D- -0.25

Answer:

D