Question 1

Question Type: MultipleChoice

The gradient of a smooth function is

Options:

A- a vector that shows the direction of fastest change of a function

B- matrix of second partial derivatives of a function

C- infinite at a maximum point

D- a matrix containing the function's second partial derivatives

Answer:

A

Question 2

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 3

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 4

Question Type: MultipleChoice

Newton-Raphson iteration is used to find a solution of $x^5 - x^3 + x = 1$. If $x_n = 2$, what is x_{n+1}?

Options:

A- 2.362

B- 1.623

C- 1.638

D- 0.377

Answer:

C

Question 5

Question Type: **MultipleChoice**

What can be said about observations of random variables that are i.i.d. a normally distributed?

Options:

A- The estimated mean divided by the estimated variance has a t-distribution

B- The estimated mean divided by the estimated variance has a Chi2-distribution

C- The estimated mean divided by the estimated standard deviation has a t-distribution

D- The estimated mean divided by the estimated standard deviation has a Chi2-distribution

Answer:

C

Question 6

Question Type: **MultipleChoice**

You are to perform a simple linear regression using the dependent variable Y and the independent variable X (Y = a + bX). Suppose that cov(X,Y)=10, 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?

Options:

A- b=0.5, a=2.5

B- b=0.5, a=1.5

C- b=2, a=4

D- b=2, a=0

Answer:

D

Question 7

Which of the following can be used to evaluate a regression model?

(i) Magnitude of R2

(ii) Magnitude of TSS (total sum of squares)

(iii) Tests for statistical significance

(iv) Sign and magnitude of each regression parameter

Options:

A- (i) and (iv)

B- (i), (ii), and (iii)

C- (i), (iii), and (iv)

D- (i), (ii), (iii), and (iv)

Answer:

C

Question 8

A 95% confidence interval for a parameter estimate can be interpreted as follows:

Options:

A- The probability that the real value of the parameter is within this interval is 95%.

B- The probability that the real value of the parameter is outside this interval is 95%.

C- The probability that the estimated value of the parameter is within this interval is 95%.

D- The probability that the estimated value of the parameter is outside this interval is 95%.

Answer:

A

Question 9

In statistical hypothesis tests, 'Type I error' refers to the situation in which...

Options:

A- The null hypothesis is accepted when in fact it should have been rejected

B- The null hypothesis is rejected when in fact it should have been accepted

C- Both null hypothesis and alternative hypothesis are rejected

D- Both null hypothesis and alternative hypothesis are accepted

Answer:

B

Question 10

Question Type: **MultipleChoice**

Which of the following statements are true about Maximum Likelihood Estimation?

(i) MLE can be applied even if the error terms are not i.i.d. normal.

(ii) MLE involves integrating a likelihood function or a log-likelihood function.

(iii) MLE yields parameter estimates that are consistent.

Options:

A- (i) and (ii)

B- (i) only

C- (i) and (iii)

D- (i), (ii), and (iii)

Answer:

C