AbdalRhman Gameel Ahmed Hebishy (G5)

Quiz :

1. Calculate the gradient for the function $f(x, y) = x3 - 2x2y + 4y2$ at (1,1):

Ans:

1- **Find the Partial Derivatives :**

The gradient of a function **f(x,y)** is given by the vector of its partial derivatives:

∇f(x,y)=(∂x/∂f,∂y/∂f)

Partial Derivative with respect to x:

∂x/∂f=∂x∂(x3−2x2y+4y2)
∂x/∂f=3x2−4xy

Partial Derivative with respect to y:

∂y/∂f=∂y∂(x3−2x2y+4y2)
∂y/∂f=−2x2+8y

2- Evaluate the Partial Derivatives at (1,1):

Evaluate ∂x/∂f at (1,1):

∂x/∂f(1,1)=3(1)2−4(1)(1)
∂x/∂f(1,1)=3−4
∂x/∂f(1,1)=−1

Evaluate ∂y/∂f at (1,1):

∂y/∂f(1,1)=−2(1)2+8(1)
∂y/∂f(1,1)=−2+8
∂y/∂f(1,1)=6

3- **Form the Gradient Vector**

The gradient vector at the point (1,1) is:
$\nabla f(1,1)=(\partial x\partial f(1,1),\partial y\partial f(1,1))$
$\nabla f(1,1)=(-1,6)$

2-

Ans:

The function $h(x)=\theta_0+\theta_1 x$ is typically called a **hypothesis** in the context of machine learning, particularly in linear regression.

3-
Ans:represents **single variable linear regression**.

4-
True, vector norm can be related to the cost function.

In machine learning and optimization, the cost function (also known as the loss function) is used to measure the difference between the predicted values and the actual values. The goal is to minimize this cost function to find the best parameters for the model.