

✓ Congratulations! You passed!

Grade received 100% To pass 76% or higher

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1. Given that  $f(x, y) = x^2y + 3x^2$ , find its derivative with respect to  $x$ , i.e., find  $\frac{\partial f}{\partial x}$ .

1 / 1 point

Note: Please use \* to indicate the product in the answer. So, if we would write the entire function  $f$  as an answer, it would be  $x^2 * y + 3 * x^2$ .

$2xy + 6x$

$2 * x * y + 6 * x$

✓ Correct

2. Given that  $f(x, y) = xy^2 + 2x + 3y$  its gradient, i.e.,  $\nabla f(x, y)$  is:

1 / 1 point

☐  $\begin{bmatrix} 2xy + 3 \\ y^2 + 2 \end{bmatrix}$

☐  $\begin{bmatrix} 2xy \\ 2x + 3 \end{bmatrix}$

☒  $\begin{bmatrix} y^2 + 2 \\ 2xy + 3 \end{bmatrix}$

☐  $\begin{bmatrix} 2y \\ 0 \end{bmatrix}$

✓ Correct

Correct! Applying the gradient's formula:  $\nabla f(x, y) = \begin{bmatrix} \frac{\partial f}{\partial x} \\ \frac{\partial f}{\partial y} \end{bmatrix}$ , you can get the result!

3. Let  $f(x, y) = x^2 + 2y^2 + 8y$ . The minimum value of  $f$  is:

1 / 1 point

Hint: The question asks for the **minimum value that the function can output, and not the point (x,y) that gives it.**

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✓ Correct

You are correct! Finding the  $x$  and  $y$  values that satisfies  $\nabla f(x, y) = \left( \frac{\partial f}{\partial x}, \frac{\partial f}{\partial y} \right) = (0, 0)$  and then applying them to  $f(x, y)$  gives you the correct result!

4. The gradient of  $f(x, y, z) = x^2 + 2xyz + z^2$  is:

1 / 1 point

- ☒  $\begin{bmatrix} 2x + 2yz \\ 2xz \\ 2xy + 2z \end{bmatrix}$
- ☐  $\begin{bmatrix} 2x + 2xz \\ 2yz \\ 2xy + z \end{bmatrix}$
- ☐  $\begin{bmatrix} 2x + 2yz \\ 2xy \\ 2xy + z \end{bmatrix}$
- ☐  $\begin{bmatrix} 2yz + 2xz \\ 2z \\ 2x \end{bmatrix}$

✓ Correct

Correct!