

Quiz 4 key

Part A

Question 1

1

The domain of $f(x) = \sqrt{100 - x^2 - y^2}$ is

(Choose the correct answer, type in the letter in the blank. Just the letter, not the parentheses)

(A) $\{(x, y) \mid -10 \leq x \leq 10, -10 \leq y \leq 10\}$

(B) $\{(x, y) \mid -10 < x < 10, -10 < y < 10\}$

(C) $\{(x, y) \mid x^2 + y^2 \leq 100\}$

(D) $\{(x, y) \mid x^2 + y^2 \leq 10\}$



C

Correct answer

Question 2

The range of $g(x, y) = \sqrt{64 - x^2 - y^2}$ is

(Type in the letter of the correct answer in the blank. Just the letter.)

(A) $\{z \mid z > 0\}$

(B) $\{z \mid z \geq 0\}$

(C) $\{z \mid 0 < z < 8\}$

(D) $\{z \mid 0 \leq z \leq 8\}$



D

Correct answer

Question 3

What kind of shape is $f(x, y) = \sqrt{x^2 + y^2 + 4}$



Cone

☐ Sphere

☐ Circle

☐ Paraboloid

I gave everyone credit. It was supposed to be $\sqrt{x^2 + y^2} + 4$

Correct answer

Question 4

Find $\frac{\partial f}{\partial x}$ where $f(x, y) = 3x^4y^5 + 12x - 2y^3$

(Type in the letter of the correct answer, just the letter)

(A) $\frac{\partial f}{\partial x} = 12x^3y^5 + 12$

(B) $\frac{\partial f}{\partial x} = 12x^3y^5$

(C) $\frac{\partial f}{\partial x} = 12x^3y^5 + 12 - 6y^2$

(D) $\frac{\partial f}{\partial x} = 15x^4y^4 - 6y^2$



A

Correct answer

Question 5

Find $\frac{\partial f}{\partial y}$ where $f(x, y) = \int_y^4 \cos(t^2) dt$

(Select the correct letter, type it into the box, just the letter)

(A) $2t \cos(t^2)$

(B) $-\cos(y^2)$

(C) $\cos(y^2)$

(D) $\cos(16) - \cos(y^2)$



B

Part B

1. Let $f(x, y) = x^3 \sin(x^4 y^5)$. Write out these partial derivatives:

$f_x, f_y, f_{xx}, f_{yy}, f_{xy}, f_{yx}$. (0.5 pt each, 3 pts total)

$$f_x = 4x^6 y^5 \cos(x^4 y^5) + 3x^2 \sin(x^4 y^5) \quad f_y = 5x^7 y^4 \cos(x^4 y^5)$$

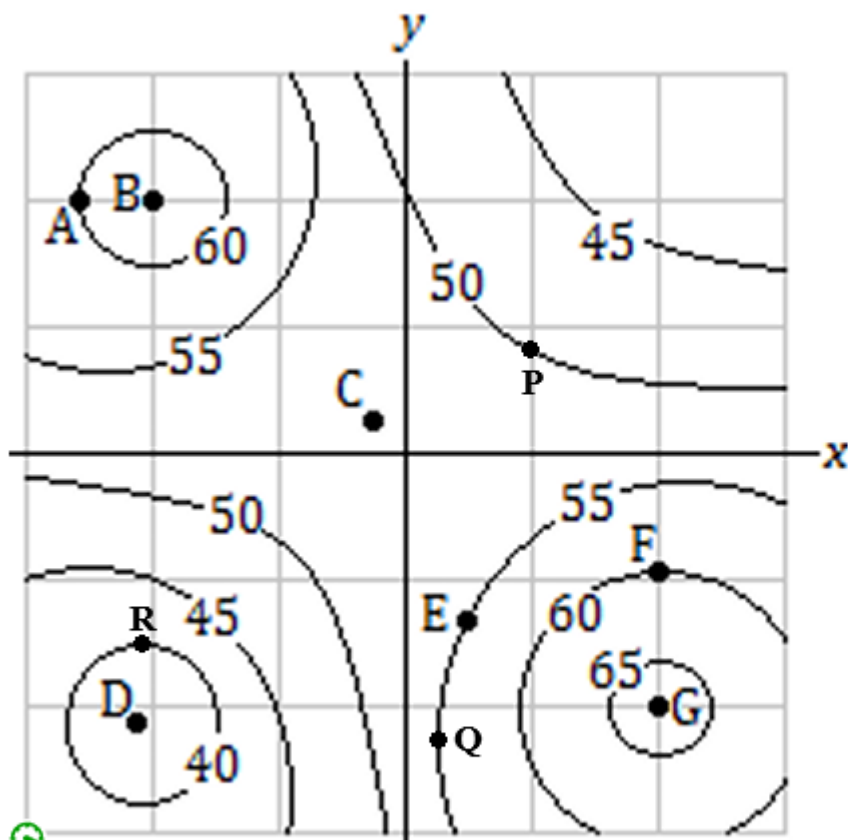
$$f_{xx} = -16x^9 y^{10} \sin(x^4 y^5) + 36x^5 y^5 \cos(x^4 y^5) + 6x \sin(x^4 y^5)$$

$$f_{yy} = -25x^{11} y^8 \sin(x^4 y^5) + 20x^7 y^3 \cos(x^4 y^5)$$

$$f_{xy} = -20x^{10} y^9 \sin(x^4 y^5) + 35x^6 y^4 \cos(x^4 y^5)$$

$$f_{yx} = -20x^{10} y^9 \sin(x^4 y^5) + 35x^6 y^4 \cos(x^4 y^5)$$

2. Consider the contour map below of a function $z = f(x, y)$:



Write out the signs (+, -, 0) for the following partial derivatives: (0.5 pt each, 2 pts total)

(i) $f_x(Q)$, (ii) $f_y(Q)$, (iii) $f_x(R)$, (iv) $f_y(R)$

$$f_x(Q): +, \quad f_y(Q): 0, \quad f_x(R): 0, \quad f_y(R): +$$