

1. Find the equation of a sphere whose center is $(3, -5, 1)$ and radius is 7.
2. Find the distance between $(2, -3, 1)$ and $(3, -5, -1)$.
3. Find the midpoint of $(2, -3, 1)$ and $(3, -5, -1)$.
4. a. Find the domain of the function.
 $z = f(x, y) = \ln(y - x^2)$
- b. Evaluate the function at $f(2, 6)$

Given the function, find the partial derivatives.

5. $f(x, y) = x^2 e^y + 2xy^2$

Find f_x , f_y , f_{xx} , f_{yy} , f_{yx} , and f_{xy} .

6. $f(x, y) = \frac{3xy}{x^3 - y^2}$

Find f_x , f_y .

7. $f(x, y) = \ln(x^3 + y^2)$. Find f_x , f_y .

8. State the critical point and determine whether it is a maximum, minimum, or saddle.

$$D = f_{xx}(x, y) \cdot f_{yy}(x, y) - (f_{xy}(x, y))^2$$

$$f(x, y) = x^2 - y^2 - 2x - 6y + xy$$