

Lesson 19

Find the first partial derivatives for the following functions:

1. $f(x, y) = y^5 - 3xy$

2. $f(u, v) = u^4v^3 + 8u^2v$

3. $f(x, y) = \ln(\sqrt{x^2 + xy} - 1)$

4. $f(x, y) = \sin(xy)$

5. $f(x, y) = ye^{2x+3y}$

6. $f(x, y) = \frac{4x}{y}$

7. $f(x, y) = \frac{x - y}{3x + y}$

8. $f(x, y) = y^2 \ln(x^2 + y^2)$

9. $f(u, v) = 5uv + 5e^{uv+2v}$

Answers:

1. $f_x = -3y, f_y = 5y^4 - 3x$

2. $f_u = 4u^3v^3 + 16uv, f_v = 3u^4v^2 + 8u^2$

3. $f_x = \frac{2x+y}{2(x^2+xy-1)}, f_y = \frac{x}{2(x^2+xy-1)}$

4. $f_x = y \cos(xy), f_y = x \cos(xy)$

5. $f_x = 2ye^{2x+3y}, f_y = (1+3y)e^{2x+3y}$

6. $f_x = \frac{4}{y}, f_y = \frac{-4x}{y^2}$

7. $f_x = \frac{4y}{(3x+y)^2}, f_y = \frac{-4x}{(3x+y)^2}$

8. $f_x = \frac{2xy^2}{x^2+y^2}, f_y = 2y \ln(x^2+y^2) + \frac{2y^3}{x^2+y^2}$

9. $f_u = 5v + 5ve^{uv+2v}, f_v = 5u + 5(u+2)e^{uv+2v}$