FIRST PARTIALS - ANSWERS

For each of the following functions, find $\dfrac{\partial f}{\partial x}$ and $\dfrac{\partial f}{\partial y}$.

1. $z = f(x, y) = x^3 y^2$

$$\frac{\partial f}{\partial x} = 3x^2 y^2$$

$$\frac{\partial f}{\partial y} = 2x^3 y$$

2. $z = f(x, y) = \sin(x^3 y^2)$

$$\frac{\partial f}{\partial x} = \cos(x^3 y^2) \cdot 3x^2 y^2 = 3x^2 y^2 \cos(x^3 y^2)$$

$$\frac{\partial f}{\partial y} = \cos(x^3 y^2) \cdot 2x^3 y = 2x^3 y \cos(x^3 y^2)$$

3. $z = f(x, y) = \sqrt{x^3 y^2}$

$$\frac{\partial f}{\partial x} = \frac{1}{2\sqrt{x^3 y^2}} \cdot 3x^2 y^2 = \frac{3x^2 y^2}{2\sqrt{x^3 y^2}}$$

$$\frac{\partial f}{\partial y} = \frac{1}{2\sqrt{x^3 y^2}} \cdot 2x^3 y = \frac{x^3 y}{\sqrt{x^3 y^2}}$$

4. $z = f(x, y) = \sec(x^3 y^2)$

$$\frac{\partial f}{\partial x} = \sec(x^3 y^2)\tan(x^3 y^2) \cdot 3x^2 y^2 = 3x^2 y^2 \sec(x^3 y^2)\tan(x^3 y^2)$$

$$\frac{\partial f}{\partial y} = \sec(x^3 y^2)\tan(x^3 y^2) \cdot 2x^3 y = 2x^3 y \sec(x^3 y^2)\tan(x^3 y^2)$$

5. $z = f(x, y) = \tan(x^3 y^2)$

$$\frac{\partial f}{\partial x} = \sec^2(x^3 y^2) \cdot 3x^2 y^2 = 3x^2 y^2 \sec^2(x^3 y^2)$$

$$\frac{\partial f}{\partial y} = \sec^2(x^3 y^2) \cdot 2x^3 y = 2x^3 y \sec^2(x^3 y^2)$$