

GRADIENT TO A LEVEL CURVE

For each of the following functions, find ∇_z , the gradient.

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

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

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

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

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

6. $z = f(x, y) = \sin^{-1}(x^3 y^2)$

7. $z = f(x, y) = \sqrt[3]{x^2 + y + 4} = (x^2 + y + 4)^{1/3}$

8. $z = f(x, y) = e^{-(x^2 + y^2)}$

9. $z = f(x, y) = \ln(xy)$

10. $z = f(x, y) = \frac{xy + 1}{x + y}$