

# Implicit Differentiation Worksheet - Answer Key

Use implicit differentiation to find  $\frac{dy}{dx}$ .

1.  $xy + y = \sin(x)$

$$\frac{dy}{dx} = \frac{\cos(x)-y}{x+1}$$

6.  $(x^2 + y^2)^{99} = \alpha$

$$\frac{dy}{dx} = -\frac{x}{y}$$

2.  $\sqrt{x} + \sqrt{yx^2} = x$

$$\frac{dy}{dx} = \frac{2\sqrt{y}}{x} \left(1 - \sqrt{y} - \frac{1}{2\sqrt{y}}\right)$$

7.  $\frac{\tan(y)}{x} + ax = y$

$$\frac{dy}{dx} = \frac{ax^2 - \tan(y)}{x(x - \sec^2(y))}$$

3.  $x^3y^2 + y = 7$

$$\frac{dy}{dx} = \frac{-3x^2y^2}{1+2x^3y}$$

8.  $x \cos(y) = 1$

$$\frac{dy}{dx} = \frac{\cot(y)}{x}$$

4.  $\ln(x^2 + y^2 - xy) = 100$

$$\frac{dy}{dx} = \frac{y-2x}{2y-x}$$

9.  $e^{x \sin(y)} = y$

$$\frac{dy}{dx} = \frac{\sin(y)}{e^{-x \sin(y)} - x \cos(y)}$$

5.  $xy^2 + x^2y = x$

$$\frac{dy}{dx} = \frac{1-2xy-y^2}{x(x+2y)}$$

10.  $2^{\sqrt{xy}} = x$

$$\frac{dy}{dx} = -\frac{y}{x} + \sqrt{\frac{y}{x}} \frac{(2^{1-\sqrt{xy}})}{\ln(2)}$$

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