

Name : _____

Score : _____

Teacher : _____

Date : _____

Implicit Differentiation

Use implicit differentiation to find each derivative.

1) $(9x^4y^3 + 9)^5 = 0$

2) $(x^5y^3 + 1)^5 = -4x^3$

3) $11x^5 = -6y^3 - 8y^2$

4) $-8x^3 = 11x^2 + 9y^6 - 7y^2$

5) $2x^3 = -2x^4y^5 - 6x^5y^6$

6) $4x^5 = -(9x^6y^3 + 5)^5$

7) $-5x^6 = 6x^2 - 10y^5$

8) $(10x^6y^3 + 4)^6 = -6x^2$

9) $6x^3 = -5x^2y^3 - 4x^5y^5$

10) $3x^5y^3 + 2x^3 = -2x^6y^4$



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Implicit Differentiation

Use implicit differentiation to find each derivative.

1) $(9x^4y^3 + 9)^5 = 0$

$$\frac{dy}{dx} = \frac{1}{x^2y^2(9x^4y^3 + 9)^4} - \frac{4y}{3x}$$

2) $(x^5y^3 + 1)^5 = -4x^3$

$$\frac{dy}{dx} = \frac{-4}{5x^3y^2(x^5y^3 + 1)^4} - \frac{5y}{3x}$$

3) $11x^5 = -6y^3 - 8y^2$

$$\frac{dy}{dx} = \frac{-55x^4}{16y + 18y^2}$$

4) $-8x^3 = 11x^2 + 9y^6 - 7y^2$

$$\frac{dy}{dx} = \frac{22x + 24x^2}{14y - 54y^5}$$

5) $2x^3 = -2x^4y^5 - 6x^5y^6$

$$\frac{dy}{dx} = \frac{-8xy^5 - 30x^2y^6 - 6}{10x^2y^4 + 36x^3y^5}$$

6) $4x^5 = -(9x^6y^3 + 5)^5$

$$\frac{dy}{dx} = \frac{-4}{27x^2y^2(9x^6y^3 + 5)^4} - \frac{2y}{x}$$

7) $-5x^6 = 6x^2 - 10y^5$

$$\frac{dy}{dx} = \frac{12x + 30x^5}{50y^4}$$

8) $(10x^6y^3 + 4)^6 = -6x^2$

$$\frac{dy}{dx} = \frac{-1}{15x^5y^2(10x^6y^3 + 4)^5} - \frac{2y}{x}$$

9) $6x^3 = -5x^2y^3 - 4x^5y^5$

$$\frac{dy}{dx} = \frac{-10y^3 - 20x^3y^5 - 18x}{15xy^2 + 20x^4y^4}$$

10) $3x^5y^3 + 2x^3 = -2x^6y^4$

$$\frac{dy}{dx} = \frac{-15x^2y^3 - 12x^3y^4 - 6}{9x^3y^2 + 8x^4y^3}$$

