

Calculus Practice: Implicit Differentiation 2b

For each problem, use implicit differentiation to find y' at the given point.

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

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

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

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

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

6) $(xy + 4)^2 = 4x^3$ at $(1, -6)$

7) $x + 5x^2 - 4 = \ln y^2$ at $(-1, 1)$

8) $2x^3 + x^2 + 1 = \ln x^3y^3$ at $(-1, -1)$

9) $2x + 3x^3 + 5 = \ln y^2$ at $(-1, 1)$

10) $\ln x^2y = 3x + 4x^3 + 7$ at $(-1, 1)$

11) $\ln y^3 = 5x^2 + 2x - 3$ at $(-1, 1)$

12) $4x + 4 = \ln y^2$ at $(-1, 1)$

For each problem, use implicit differentiation to find y'' at the given point.

13) $4x - 3y^2 = 1$ at $(1, 1)$

14) $1 = 2x - 3y^2$ at $(2, 1)$

15) $4y^2 + 4 = x^3$ at $(2, 1)$

16) $3x^3 = -y^2 + 4$ at $(1, 1)$

17) $-y^2 + 2 = 2x^3$ at $(-1, 2)$

18) $2x^3 = -y^2 + 3$ at $(1, 1)$

19) $4 = 3x^2 - 2y^2$ at $(2, 2)$

20) $2x = -y^2 + 3$ at $(1, 1)$

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For each problem, use implicit differentiation to find y' at the given point.

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

At $(-1, -1)$, $y' = -\frac{1}{12}$

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

At $(-1, -3)$, $y' = -\frac{23}{2}$

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

At $(-1, -1)$, $y' = -\frac{2}{9}$

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

At $(-1, 5)$, $y' = -\frac{1}{2}$

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

At $(1, 1)$, $y' = 1$

6) $(xy + 4)^2 = 4x^3$ at $(1, -6)$

At $(1, -6)$, $y' = 3$

7) $x + 5x^2 - 4 = \ln y^2$ at $(-1, 1)$

At $(-1, 1)$, $y' = -\frac{9}{2}$

8) $2x^3 + x^2 + 1 = \ln x^3y^3$ at $(-1, -1)$

At $(-1, -1)$, $y' = -\frac{7}{3}$

9) $2x + 3x^3 + 5 = \ln y^2$ at $(-1, 1)$

At $(-1, 1)$, $y' = \frac{11}{2}$

10) $\ln x^2y = 3x + 4x^3 + 7$ at $(-1, 1)$

At $(-1, 1)$, $y' = 17$

$$11) \ln y^3 = 5x^2 + 2x - 3 \text{ at } (-1, 1)$$

$$\text{At } (-1, 1), y' = -\frac{8}{3}$$

$$12) 4x + 4 = \ln y^2 \text{ at } (-1, 1)$$

$$\text{At } (-1, 1), y' = 2$$

For each problem, use implicit differentiation to find y'' at the given point.

$$13) 4x - 3y^2 = 1 \text{ at } (1, 1)$$

$$\text{At } (1, 1), y'' = -\frac{4}{9}$$

$$14) 1 = 2x - 3y^2 \text{ at } (2, 1)$$

$$\text{At } (2, 1), y'' = -\frac{1}{9}$$

$$15) 4y^2 + 4 = x^3 \text{ at } (2, 1)$$

$$\text{At } (2, 1), y'' = -\frac{3}{4}$$

$$16) 3x^3 = -y^2 + 4 \text{ at } (1, 1)$$

$$\text{At } (1, 1), y'' = -\frac{117}{4}$$

$$17) -y^2 + 2 = 2x^3 \text{ at } (-1, 2)$$

$$\text{At } (-1, 2), y'' = \frac{15}{8}$$

$$18) 2x^3 = -y^2 + 3 \text{ at } (1, 1)$$

$$\text{At } (1, 1), y'' = -15$$

$$19) 4 = 3x^2 - 2y^2 \text{ at } (2, 2)$$

$$\text{At } (2, 2), y'' = -\frac{3}{8}$$

$$20) 2x = -y^2 + 3 \text{ at } (1, 1)$$

$$\text{At } (1, 1), y'' = -1$$