

Calculus AB

2-5

Implicit Differentiation

Nov 12-9:02 AM

Find $\frac{dy}{dx}$.

Explicit Differentiation -

$$\begin{aligned}3x + 2y &= 7 \\2y &= -3x + 7 \\y &= -\frac{3}{2}x + \frac{7}{2} \\\frac{dy}{dx} &= -\frac{3}{2}\end{aligned}$$

Implicit Differentiation-

$$\begin{aligned}3x + 2y &= 7 \\3 + 2\frac{dy}{dx} &= 0 \\2\frac{dy}{dx} &= -3 \\\frac{dy}{dx} &= -\frac{3}{2}\end{aligned}$$

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Find dy/dx by implicit differentiation.

$$1) \quad x^2 + y^2 = 36$$

chain rule

$$2x + 2y \frac{dy}{dx} = 0$$

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

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

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Find $\frac{dy}{dx}$

$$9) \quad x^3 - 3x^2y + 2xy^2 = 12$$

$$3x^2 - 6xy - 3x^2 \frac{dy}{dx} + 2y^2 + 2x(2y \frac{dy}{dx}) = 0$$

$$-3x^2 \frac{dy}{dx} + 4xy \frac{dy}{dx} = 6xy - 3x^2 - 2y^2$$

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

$$\frac{dy}{dx} = \frac{6xy - 3x^2 - 2y^2}{-3x^2 + 4xy}$$

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$$21) \ xy = 4 \quad (-4, 1)$$

$$y + x \frac{dy}{dx} = 0$$

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

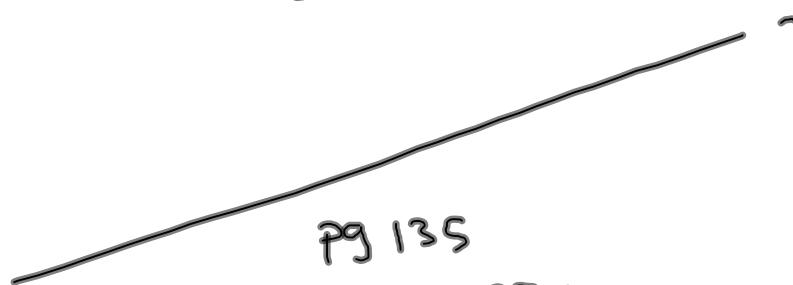
$$\frac{dy}{dx} = -\frac{y}{x} \Big|_{(-4,1)} = \frac{1}{4}$$

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2-16 even

22-28 even



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92-97 all

104-108 all

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