

Calculus I

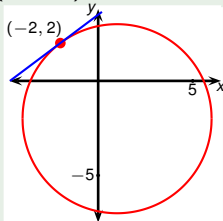
Tangent to implicit curve, part 2

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Example

Find an equation of the tangent line to $(x - 1)^2 + (y + 2)^2 = 25$ at $(-2, 2)$.



Find $\frac{dy}{dx}$, given $(x - 1)^2 + (y + 2)^2 = 25$:

$$\frac{d}{dx} \left((x - 1)^2 \right) + \frac{d}{dx} \left((y + 2)^2 \right) = \frac{d}{dx} (25)$$

$$2(x - 1) \frac{d}{dx} (x - 1) + 2(y + 2) \frac{d}{dx} (y + 2) = 0$$

$$2(x - 1)(1) + 2(y + 2) \left(\frac{dy}{dx} \right) = 0$$

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

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

Plug in $(-2, 2)$:

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

Point-slope form:

$$y - 2 = \frac{3}{4}(x + 2)$$