

Review - implicit diff.

$$y^2 - 7y + x^2 - 4x = 0$$

Find $\frac{dy}{dx}$

$$2y \frac{dy}{dx} - 7 \frac{dy}{dx} + 2x - 4 = 0$$

$$2y \frac{dy}{dx} - 7 \frac{dy}{dx} = -2x + 4$$

$$\frac{dy}{dx} \left(\frac{2y-7}{2y-7} \right) = \frac{-2x+4}{2y-7}$$

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find tangent line to this curve @ (0, 7)

$$\frac{dy}{dx} = \frac{-2(0)+4}{2(7)-7} = \frac{4}{7}$$

$$y = 7 + \frac{4}{7}x$$

(implicit)

$$x^3 + y^3 = 6xy$$

$$3x^2 + 3y^2 \frac{dy}{dx} = 6 \left(x \frac{dy}{dx} + y \right)$$

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

$$\begin{array}{r} 3x^2 - 6y + 3y^2 \frac{dy}{dx} = 6x \frac{dy}{dx} \\ -3y^2 \frac{dy}{dx} \quad -3y^2 \frac{dy}{dx} \end{array}$$

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

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

in general:

$$\frac{a-b}{c-d} = \frac{b-a}{d-c}$$

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$$k(x) = e^{-x^2} \quad -\infty < x < \infty$$

$$k'(x) = e^{-x^2} \cdot -2x$$

$$k'(x) = -2xe^{-x^2}$$

$$= \frac{-2x}{e^{x^2}}$$

$k'(x)$ undef. (nowhere)

$$k'(x) = 0 \quad @ \quad x = 0$$

c.p.

$$k(0) = 1$$

$$k(-1) = \frac{1}{e} \approx \frac{1}{3}$$

$$k(1) = \frac{1}{e} \approx \frac{1}{3}$$