THUR 11-10-05

$(2x-5)\sqrt{x+1}$

*PARETHESES ARE EXTREMELY NECESSARY!

Quick Rev. 2, 6-9

(2) $4x^2 + 9y^2 = 36$

$$\frac{9y^2}{9} = \frac{-4x^2 + 36}{9}$$

$$y^2 = \frac{-4x^2 + 36}{9}$$

$$y = \pm\sqrt{\frac{-4x^2+36}{9}}$$

$$y_1 = \sqrt{\frac{-4x^2+36}{9}} \quad \text{TOP}$$

$$y_2 = -\sqrt{\frac{-4x^2+36}{9}} \quad \text{BOTTOM}$$

ELLIPSE

3.7 IMPLICIT DIFFERENTIATION

- A PROCESS OF FINDING DERIVATIVES OF EQUATIONS THAT ARE NOT "SOLVED FOR y."

Ex) $x^3 + y^2 - 9xy = 0$, FIND y'.

Ex. 1) $x = y^2$; Find $\frac{dy}{dx}$.

$$\frac{d(x)}{dx} = \frac{d(y^2)}{dx}$$

THE CHAIN RULE

$$1 = 2 \cdot y \cdot \frac{dy}{dx}$$

$$\frac{1}{2y} = \frac{dy}{dx} \quad \text{or} \quad y' = \frac{1}{2y}$$

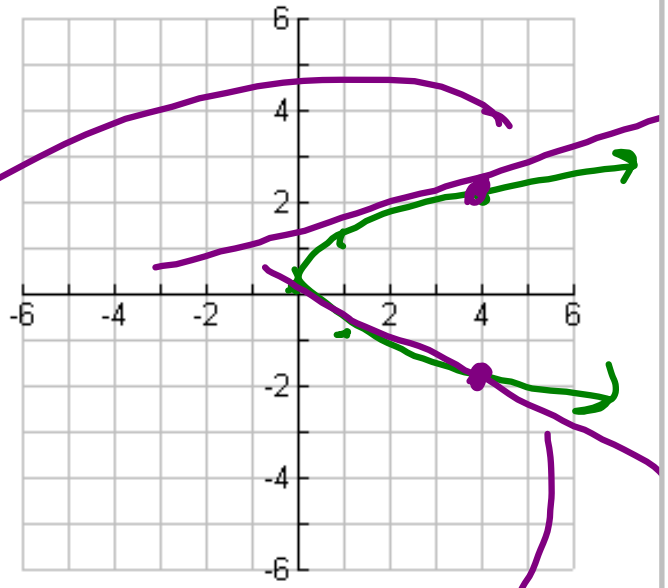
FIND THE SLOPE OF THE TANGENT LINE AT $x = 4$; $x = y^2$.

Soln: $m_{tan} = \frac{dy}{dx} = \frac{1}{2y}$

$x = 4 \rightarrow \quad 4 = y^2$

$y = \pm 2$

$m_1 = \frac{1}{4}$; $m_2 = \frac{-1}{4}$



P.151 #10 $x^3+y^3=18xy$. FIND $\frac{dy}{dx}$

SOLN: TAKE $\frac{d}{dx}$ OF EACH TERM.

PRODUCT RULE

$$3x^2+3y^2\cdot\frac{dy}{dx}=18x\cdot 1\cdot\frac{dy}{dx}+y\cdot 18$$

$$3x^2+3y^2\cdot y'=18x\cdot y'+18y$$

SOLVE FOR y'

$$3y^2\cdot y'-18x\cdot y'=18y-3x^2$$

$$y'(3y^2-18x)=18y-3x^2$$

$$y'=\frac{18y-3x^2}{3y^2-18x}=\frac{3(6y-x^2)}{3(y^2-6x)}$$

$$y'=\frac{6y-x^2}{y^2-6x}$$

P.155 (12) $x^2 = \dfrac{x-y}{x+y}$; FIND $\dfrac{dy}{dx}$.

SOLN: QUOTIENT RULE

$$\frac{V \cdot M' - M \cdot V'}{V^2}$$

TAKE THE DERIV. OF EACH TERM:

$$2x = \frac{(x+y)(1-1\cdot y') - (x-y)(1+1\cdot y')}{(x+y)^2}$$

$$2x = \frac{x+y-x\cdot y'-y\cdot y' - (x-y+x\cdot y'-y\cdot y')}{(x+y)^2}$$

$$2x = \frac{x+y-x\cdot y'-y\cdot y' - (x-y+x\cdot y'-y\cdot y')}{(x+y)^2}$$

$$2x = \frac{x+y-x\cdot y'-y\cdot y' - x+y-x\cdot y'+y\cdot y'}{(x+y)^2}$$

$$2x = \frac{2y-2x\cdot y'}{(x+y)^2}$$

$$\frac{2x(x+y)^2}{2} = \frac{2y}{2} - \frac{2xy'}{2}$$

$$x(x+y)^2 = y - x\cdot y'$$

$$x(x+y)^2 - y = -x\cdot y'$$

$$\frac{x(x+y)^2-y}{-x} = y' = \frac{y-x(x+y)^2}{x}$$

$$y' = \frac{y}{x} - (x+y)^2$$

O.T.L.

- CORRECT TESTS
- P.152 Ex. 5
- P.155 7-27 (ODD)

"DON'T GET DISCOURAGED"