Calculus AB

2-5

(Day 2)

Implicit Differentiation

Nov 13-11:32 AM

Find $\frac{d^2x}{dx^2}$ in terms of x and y. (pg 142)

35) $x^2 + y^2 = 36$

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

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

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

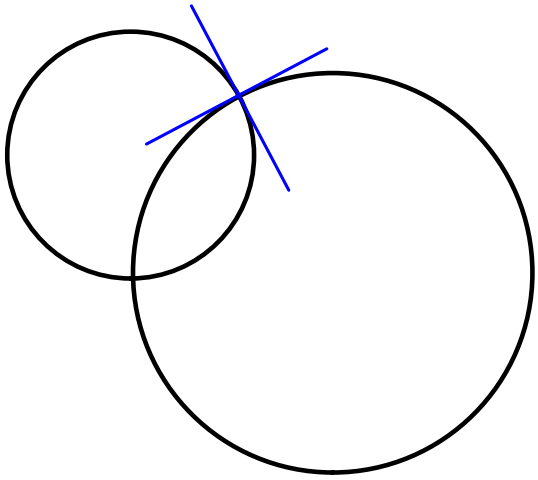
$$\frac{dy}{dx} = -\frac{x}{y}$$

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

Nov 13-11:34 AM

Orthogonal -

Graphs are orthogonal if at their points of intersection, their tangent lines are perpendicular.



Nov 10-8:17 AM

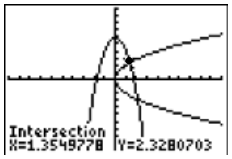
Use a graphing utility to sketch the intersecting graphs of the equations and show that they are orthogonal. [Two graphs are *orthogonal* if at their points of intersection, their tangent lines are perpendicular.]

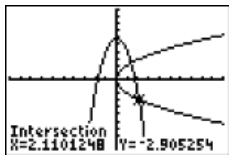
49) $2x^2 + y = 6$

$y^2 = 4x$

(1.35, 2.33)

(2.11, -2.91)





$4x + \frac{dy}{dx} = 0$

$\frac{dy}{dx} = -4x$

$2y\frac{dy}{dx} = 4$

$\frac{dy}{dx} = \frac{4}{2y} = \frac{2}{y}$

Not orthogonal!

$-4(1.35) = -5.4$

$-4(2.11) = -8.44$

$\frac{2}{2.33} = 0.858$

$\frac{2}{-2.91} = -0.687$

Nov 13-11:42 AM

Assignment:

Pg. 142

18, 30, 32,
36, 38, 40,
50, 52, 61

Nov 13-11:50 AM