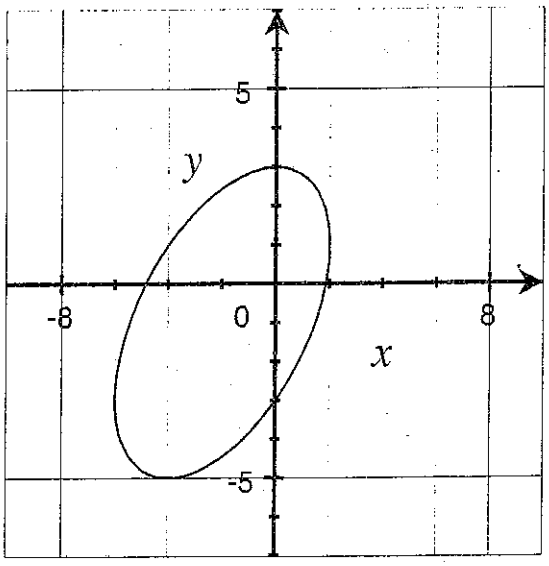
Implicit differentiation worksheet for Calculus 1

Determine dy/dx for each of the following.

(1) $y = x^2 + xy$
(2) $x^2y + y = 3$
(3) $x^{1/4} + y^{1/4} = 2$
(4) $x^{1/3} + y^{1/3} = 7$
(5) $\sqrt{x} + \sqrt{y} = 25$
(6) $x^2 + y^2 = 1.1$
(7) $x^3 + y^3 = \sqrt{5}$
(8) $x + \sin(y) = y + 1$

Determine d^2y/dx^2 for each of the following.

(17) $1 - xy = x - y^2$
(18) $x - y = (x + y)^2$



For the curve $x^2 + y^2 - xy + 3x - 9 = 0$ (above),

(21) Determine dy/dx.
(22) Where do the horizontal tangent lines occur?
(23) Where do the vertical tangent lines occur ($dy/dx = \pm\infty$)?
(24) Determine d^2y/dx^2.

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Name_____

Implicit Differentiation

Date_____ Period____

For each problem, use implicit differentiation to find $\frac{dy}{dx}$ in terms of x and y.

1) $2x^3 = 2y^2 + 5$

2) $3x^2 + 3y^2 = 2$

3) $5y^2 = 2x^3 - 5y$

4) $4x^2 = 2y^3 + 4y$

5) $5x^3 = -3xy + 2$

6) $1 = 3x + 2x^2y^2$

11) $\sin 2x^2y^3 = 3x^3 + 1$

12) $3x^2 + 3 = \ln 5xy^2$

For each problem, use implicit differentiation to find $\frac{d^2y}{dx^2}$ in terms of x and y.

13) $4y^2 + 2 = 3x^2$

14) $5 = 4x^2 + 5y^2$