Higher Order Implicit Derivatives … Set 1

Implicit differentiation--Second derivatives

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

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

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

3) $5x^2 = 5y^2 + 4$

4) $x^3 + 4y^2 = 1$

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

6) $5 = 4x^3 - 4y^2$

7) $2 = 2x^2 - 4y^2$

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

9) $2x - 5y^2 = 3$

10) $5x^3 = -4y^2 + 4$

11) $4x^2 = 5y^2 + 2$

12) $3x^2 = -3y^2 + 3$

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Answers

1) $\dfrac{d^2y}{dx^2} = \dfrac{24xy^2 - 9x^4}{16y^3}$

2) $\dfrac{d^2y}{dx^2} = -\dfrac{25}{36y^3}$

3) $\dfrac{d^2y}{dx^2} = \dfrac{y^2 - x^2}{y^3}$

4) $\dfrac{d^2y}{dx^2} = \dfrac{-48xy^2 - 9x^4}{64y^3}$

5) $\dfrac{d^2y}{dx^2} = \dfrac{-3y^2 - 9x^2}{y^3}$

6) $\dfrac{d^2y}{dx^2} = \dfrac{12xy^2 - 9x^4}{4y^3}$

7) $\dfrac{d^2y}{dx^2} = \dfrac{2y^2 - x^2}{4y^3}$

8) $\dfrac{d^2y}{dx^2} = \dfrac{-4y^2 - x^2}{16y^3}$

9) $\dfrac{d^2y}{dx^2} = -\dfrac{1}{25y^3}$

10) $\dfrac{d^2y}{dx^2} = \dfrac{-240xy^2 - 225x^4}{64y^3}$

11) $\dfrac{d^2y}{dx^2} = \dfrac{20y^2 - 16x^2}{25y^3}$

12) $\dfrac{d^2y}{dx^2} = \dfrac{-y^2 - x^2}{y^3}$

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13) $5x^3 = 4y^2 + 4$

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

15) $-2y^2 + 2 = 3x$

16) $5 = 4x - 5y^2$

17) $5 = x^2 - 2y^2$

18) $-4y^2 + 4 = 4x^2$

19) $5 = 2x - 5y^2$

20) $5y^2 + 2 = 5x^2$

Higher Order Implicit Derivatives … Set 1

13) $\dfrac{d^2y}{dx^2} = \dfrac{240xy^2 - 225x^4}{64y^3}$

14) $\dfrac{d^2y}{dx^2} = -\dfrac{1}{y^3}$

15) $\dfrac{d^2y}{dx^2} = -\dfrac{9}{16y^3}$

16) $\dfrac{d^2y}{dx^2} = -\dfrac{4}{25y^3}$

17) $\dfrac{d^2y}{dx^2} = \dfrac{2y^2 - x^2}{4y^3}$

18) $\dfrac{d^2y}{dx^2} = \dfrac{-y^2 - x^2}{y^3}$

19) $\dfrac{d^2y}{dx^2} = -\dfrac{1}{25y^3}$

20) $\dfrac{d^2y}{dx^2} = \dfrac{y^2 - x^2}{y^3}$