

$$30) (4-x)(y^2) = x^3 \quad (2,2)$$

$$-1y^2 + (4-x)(2y \frac{dy}{dx}) = 3x^2$$

$$\frac{(4-x)(2y \frac{dy}{dx})}{(4-x)2y} \Big|_{(2,2)} = \frac{16}{8} = 2$$

$$36) x^2 y^2 - 2x = 3$$

$$\frac{2xy^2 + x^2(2y \frac{dy}{dx})}{\text{product rule}} - 2 = 0$$

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

$$\frac{dy}{dx} = \frac{2 - 2xy^2}{2x^2 y} = \frac{1 - xy^2}{x^2 y}$$

$$\frac{d^2 y}{dx^2} = \frac{[-y^2 + (-x)2y \frac{dy}{dx}]x^2 y - [1 - xy^2][2xy + x^2 \frac{dy}{dx}]}{x^4 y^2}$$

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$$38) 1 - xy = x - y$$

$$0 - y - x \frac{dy}{dx} = 1 - \frac{dy}{dx}$$

$$\frac{dy}{dx} - x \frac{dy}{dx} = 1 + y$$

$$\frac{dy}{dx} = \frac{1+y}{1-x}$$

$$\frac{d^2 y}{dx^2} = \frac{\left[\frac{dy}{dx}(1-x) \right] - [(1+y)(-1)]}{(1-x)^2} = \frac{1+y + (1-x) \frac{dy}{dx}}{(1-x)^2}$$

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

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

$$\frac{dy}{dx} = \frac{3x^2}{2y} \Big|_{(1,1)} = \frac{3}{2}$$

$$4x + 6y \frac{dy}{dx} = 0$$

$$6y \frac{dy}{dx} = -4x$$

$$\frac{dy}{dx} = \frac{-2x}{3y} \Big|_{(1,1)} = -\frac{2}{3}$$

↑
opp.
recip.
↓

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

$$(1, 1)$$

$$(1, -1)$$

$$\frac{3(1)^2}{2(-1)} = -\frac{3}{2}$$

$$\frac{-2(1)}{3(-1)} = \frac{2}{3}$$

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