5. $x^3 - xy + y^2 = 4$

$$3x^2 \frac{dx}{dx} - \left(y\frac{dx}{dx} + x\frac{dy}{dx}\right) + 2y\frac{dy}{dx} = 0$$

$$3x^2 - y - x\frac{dy}{dx} + 2y\frac{dy}{dx} = 0$$

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

9. $x^3 - 3x^2y + 2xy^2 = 12$ $= 0$

$$3x^2\frac{dx}{dx} - \left(6xy\frac{dx}{dx} + 3x^2\frac{dy}{dx}\right) + \left(2y^2\frac{dx}{dx} + 4xy\frac{dy}{dx}\right)$$

$$\frac{dy}{dx}\left(-3x^2 + 4xy\right) = -3x^2 + 6xy - 2y^2$$

$$\frac{dy}{dx} = \frac{-3x^2 + 6xy - 2y^2}{\left(-3x^2 + 4xy\right)}$$

2.5A.2

B. Evaluate $\frac{dy}{dx}$ at $(1,1)$ if $x^2 - y^3 = 0$

$$2x\frac{dx}{dx} - 3y^2\frac{dy}{dx} = 0$$

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

C. Equations → $y - y_1 = m(x - x_1)$

Ex. If $x^2 + y^2 = 4$, find the tangent line at $(\sqrt{3}, 1)$.

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

$\frac{dy}{dx} = -\frac{x}{y} = -\frac{\sqrt{3}}{1} = -\sqrt{3}$

$y - 1 = -\sqrt{3}(x - \sqrt{3})$

Ex. Evaluate $\frac{dy}{dx}$ if $x\sin y = 2$ at $\left(2, \frac{\pi}{2}\right)$

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

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

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29, 30, 32
33, 35, 37