

MAT 102

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① Equation of circle = $x^2 + y^2 - 5x - y + 4 = 0$, $x_1 = 1, y_1 = 0$

$$2x + 2y \frac{dy}{dx} - 5 - \frac{dy}{dx} = 0$$

$$(2y - 1) \frac{dy}{dx} = 5 - 2x$$

$$\frac{dy}{dx} = \frac{5 - 2x}{2y - 1} = m = \frac{5 - 2(1)}{2(0) - 1} = \frac{5 - 2}{0 - 1} = \frac{3}{-1} = -3$$

$$y - y_1 = m(x - x_1) \Rightarrow y - 0 = -3(x - 1) \Rightarrow y = -3x + 3$$

② Equation of circle = $x^2 + y^2 - 12x - 12y + 47 = 0$

$$2x + 2y \frac{dy}{dx} - 12 - 12 \frac{dy}{dx} = 0$$

$$(2y - 12) \frac{dy}{dx} = 12 - 2x$$

$$\frac{dy}{dx} = \frac{12 - 2x}{2y - 12} = m = \frac{12 - 2(1)}{2(0) - 12} = \frac{12 - 2}{0 - 12} = \frac{10}{-12} = -5/6$$

$$y - y_1 = m(x - x_1)$$

$$y - 0 = -5/6(x - 1)$$

$$y = \frac{-5x}{6} + \frac{5}{6}$$

$$y = \frac{-5 - 5x}{6} \Rightarrow 6y = -5 - 5x \Rightarrow 6y + 5x - 5 = 0$$

$$\Rightarrow \underline{6y + 5x - 5 = 0}$$

3) Equation of circle = $x^2 + y^2 = 8x + 14y + 10 = 0$ $x_1 = 1, y_1 = 0$

$$2x + 2y \frac{dy}{dx} - 8 + 14 \frac{dy}{dx} = 0$$

$$(2y + 14) \frac{dy}{dx} = 8 - 2x$$

$$\frac{dy}{dx} = \frac{8 - 2x}{2y + 14} = \frac{2(4 - x)}{2(y + 7)} = m = \frac{4 - 1}{0 + 7} = \frac{3}{7}$$

$$y - y_1 = m(x - x_1)$$

$$y - 0 = \frac{3}{7}(x - 1)$$

$$y = \frac{3x}{7} = \frac{3}{7}$$

$$y = \frac{3x - 3}{7} \quad \text{and} \quad 7y = 3x - 3$$

$$\underline{7y - 3x + 3 = 0}$$