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Computer engineering

maths 102

$$1) \quad x^2 + y^2 - 5x - y + 4 = 0$$

$$2x + 2y \frac{dy}{dx} - 5 = \frac{dy}{dx} = -4$$

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

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

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

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

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

at $(1, 0)$

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

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

$$y - 0 = -3(x - 1)$$

$$y - 0 = -3x + 3$$

$$y + 3x = 3$$

$$y + 3x - 3 = 0$$

$$2) \quad x^2 + y^2 - 12x - 12y + 47 = 0$$

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

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

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

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

at (1, 0)

$$\frac{dy}{dx} = \frac{12 - 2(1)}{2(0) - 12} = \frac{10}{-12}$$

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

$$y - 0 = \frac{-5}{6} (x - 1)$$

$$6y - 0 = -5x + 5$$

$$6y + 5x = 5 + 0$$

$$6y + 5x = 5$$

$$6y + 5x - 5 = 0$$

3) $x^2 + y^2 - 8x + 14y + 40 = 0$

$$x^2 + y^2 - 8x + 14y = -40$$

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

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

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

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

at (1, 0)

$$\frac{dy}{dx} = \frac{-2(1) + 8}{2(0) + 14}$$

$$= \frac{6}{14} = \frac{3}{7}$$

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

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

$$7y - 0 = 3x - 3$$

$$7y - 3x = -3 + 0$$

$$7y - 3x + 3 = 0$$