$\frac{dy}{dx} = 2x + \ldots$

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

$\frac{dy}{dx} = 2x + 2y\, dy/dx - 5 - 1\, dy/dx = 0$

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

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

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

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

$\frac{dy}{dx} = m = -3$

Eqn passing through $(1, 0)$

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

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

$y = -3x + 3$

$y + 3x = 3$

$y + 3x - 3 = 0$

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

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

$$dy/dx(2y-12) + 2x - 12 = 0$$

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

$$m = -5/6$$

Eqn passing through (1, 0)

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

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

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

$$6y + 5x = 5$$

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

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

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

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

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

$\frac{dy}{dx} = \frac{8-2}{14} = \frac{6}{14} = \frac{3}{7}$

Eqn passing throught

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

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

$7y = 3x-3$

$7y-3x+3=0$

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