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 Electrical Electronics Engineering
 19/ENG04/057
 Maths 102
 S/N 204

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

$x^2 + y^2 + 2gx + 2fy + c = 0$

Comparing both equations

$2gx = -5x$

$gx = -5/2$

$2fy = -4y$

$fy = -2y$

$(g, f) = (-5/2, -2)$ $(x_1, y_1) = (1, 0)$

Using equation of a tangent.

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

$m = -\frac{(x_1 + g)}{(y_1 + f)}$

$m = -\frac{(1 + (-5/2))}{(0 + (-2))} = -\frac{(2/2 - 5/2)}{-2}$

$= -\frac{(2/2 - 5/2)}{-2}$

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

$= \frac{3/2}{2}$

$m = 3/4$

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

$y = -3x + 3$

Equation of tangent =

$y + 3x - 3 = 0$

$\frac{-2-5}{2} = -7/2$

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

$$x^2 + y^2 + 2gx + 2fy + C = 0$$

Comparing both equations -

$$2gx = -12x$$

$$g = -6$$

$$2fy = -12y$$

$$f = -6$$

$$(g, f) = (-6, -6) \quad (x, y) = (1, 0)$$

Using equation of a tangent

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

$$m = \frac{-(x_1 + y_1)}{y_1 + f}$$

$$m = \frac{-(1 + (-6))}{0 + (-6)} = \frac{+5}{-6} = -\frac{5}{6}$$

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

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

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

$$\text{Equation of the tangent} = 6y + 5x - 5 = 0$$

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

$$x^2 + y^2 + 2gx + 2fy + C = 0$$

Comparing both equations -

$$2gx = -8x$$

$$g = -4$$

$$2fy = 14y$$

$$f = 7$$

$$(g, f) = (-4, 7) \quad (x, y) = (1, 0)$$

Using equation of tangent

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

$$m = \frac{-(x_1 + y_1)}{y_1 + f}$$

$$y_1 + f$$

$$m = \frac{-(1 + (-4))}{0 + 7} = \frac{3}{7}$$

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

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

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

$$\therefore \text{Equation of tangent} = 7y - 3x + 3 = 0$$