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Date of Submission: 25/04/2020

Course: MAT102

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

Comparing to equation: $x^2 + y^2 + 2gx + 2fy + c = 0$
 equation of tangent $\rightarrow x x_1 + y y_1 + g(x + x_1) + f(y + y_1) + c$
 $x_1 = 1, y_1 = 0$

$$c = 4 \quad 2g = -5, \quad 2f = -1, \quad c = 4$$

$$x_1 = 1, \quad y_1 = 0 \quad \therefore g = -\frac{5}{2}, \quad f = -\frac{1}{2}$$

$$= 1(x) + 0(y) + \left(-\frac{5}{2}\right)(1+x) - \frac{1}{2}(y+0) + 4$$

$$= x - \frac{5}{2} - \frac{5}{2}x - \frac{1}{2}y + 4 = 0$$

$$x - \frac{5}{2}x - \frac{1}{2}y - \frac{5}{2} + 4 = 0$$

$$-1.5x - 0.5y + 1.5 = 0$$

$$\frac{-1.5x}{0.5} + \frac{1.5}{0.5} = \frac{0.5y}{0.5}$$

$$\therefore y = -3x + 3$$

$$2 \quad x^2 + y^2 - 12x - 12y + 47 = 0 \quad p(1, 0)$$

Comparing equation to $x^2 + y^2 + 2gx + 2fy + c$

$$\text{Eq of tangent: } x x_1 + y y_1 + g(x + x_1) + f(y + y_1) + c = 0$$

$$g = -6, \quad f = -6, \quad c = 47, \quad x_1 = 1, \quad y_1 = 0$$

$$(1)x + y(0) + (-6)(x+1) - 6(y+0) + 47 = 0$$

$$x - 6x - 6 - 6y + 41 = 0$$

$$-5x - 6y + 41 = 0$$

$$\frac{-5x}{6} + \frac{41}{6} = 6y$$

$$\therefore y = \frac{5x}{6} - \frac{41}{6}$$

$$3 \quad x^2 + y^2 - 8x + 14y + 40 = 0 \quad p(1, 0)$$

Comparing equation to

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

$$\text{eqn of tangent} = xx_1 + yy_1 + g(x+x_1) + f(y+y_1) + c = 0$$

$$g = -4, \quad f = 7, \quad c = 40, \quad x_1 = 1, \quad y_1 = 0$$

$$1(x) + 0(y) + (-4)(x+1) + 7(y+0) + 40 = 0$$

$$x - 4x - 4 + 7y + 40 = 0$$

$$-3x + 7y + 36 = 0$$

$$\frac{3x}{7} - \frac{36}{7} = \frac{7y}{7}$$

$$\therefore y = \frac{3x}{7} - \frac{36}{7}$$