

### Assignment

- 4) Find the equation of the tangent at the point  $(1,0)$  on the circle  $x^2 + y^2 - 5x - y + 4 = 0$

Solution

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

Comparing the given equation to  $x^2 + y^2 + 2gx + 2fy + c = 0$

$$2gx = -5x$$

$$\cancel{2x} \quad \cancel{2x}$$

$$g = -5/2$$

$$2fy = -y$$

$$\cancel{2y} \quad \cancel{2y}$$

$$f = -1/2$$

$$(x_1, y_1) = (1, 0)$$

Using equation of the tangent at point  $(1,0)$

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

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

$$y - y_1 = \left[ \frac{-(x_1 + g)}{y_1 + f} \right] (x - x_1)$$

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

$$y = \left[ \frac{-(1 - 5/2)}{-1/2} \right] (x - 1)$$

$$y = \left[ \frac{-(1 - 5/2)}{-1/2} \div -1/2 \right] (x - 1)$$

$$y = \left[ \frac{2 - 5}{1} \times \frac{2}{1} \right]$$

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