

Name: Chidera Christogonus Adubisi

Dept: Elect / Elect Eng

Matric No: 191ENGR041012

MATH 102 182 Sem 1 No.

Questions 8/10

① Find the equation of the tangent at the point $(1, 0)$ on the circle

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

$$x^2 + y^2 + 2gx + 2fy + c = 0 \quad c = a^2 + b^2 - r^2$$

Comparing the coefficients with the general form. $g = -5/2$, $f = -1/2$

$$\therefore \text{Centre is } (-g, -f) = (5/2, 1/2)$$

$$\therefore x_1 = 1 \quad y_1 = 0$$

$$x_2 = 5/2 \quad y_2 = 1/2 \quad \therefore \text{Gradient} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1/2 - 0}{5/2 - 1} = \frac{1/2}{3/2} = 1/2 \times 2/3 = 1/3$$

\therefore Equation of the tangent gradient $= -3$

$$y - y_1 = m(x - x_1) \quad | \quad y + 3x - 3 = 0$$

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

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

② Find the equation of the tangent at the point $(1, 0)$ on the circle

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

Solu

Comparing the coefficients with the general formula $x^2 + y^2 + 2gx + 2fy + c = 0$

$$\therefore g = -12/2 = -6 \quad f = -12/2 = -6$$

Hence centre is $(-g, -f) = (6, 6)$ $\therefore x_1 = 1 \quad y_1 = 0$

$$\therefore \text{Gradient} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 0}{6 - 1} = \frac{6}{5} \quad x_2 = 6 \quad y_2 = 6$$

$$\therefore \frac{6 - 0}{6 - 1} = \frac{6}{5}$$

Equation of tangent: gradient $= -5/6$

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

$$y - 0 = -5/6(x - 1)$$

$$\therefore 6[y - 0] = -5(x - 1)$$

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

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

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

3

Find the equation of the tangent at the point $(1, 0)$ on the Circle

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

Soln.

Comparing the coefficients with the general formula

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

$$g = -8/2 = -4, f = 14/2 = 7 \quad \therefore \text{Centre} = (-g, -f) = (-4, 7)$$

$$x_1 = 1 \quad y_1 = 0$$

$$x_2 = -4 \quad y_2 = 7$$

$$\therefore \text{Gradient} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 0}{-4 - 1} = \frac{7}{-5}$$

$$\therefore \text{Equation of the tangent} = \text{Gradient} = \frac{3}{7}$$

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

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

$$7(y - 0) = 3(x - 1)$$

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

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

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