

Project Mosogofoluna Goodness.

Computer Engineering.

19/ENG02/006-

maths 102 assignment

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

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

solution-

General equation of a circle is

$$x^2 + y^2 + 2gx + 2fy + c = 0 \quad \text{--- (1)}$$

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

$$2gx = -5x \quad g = -\frac{5}{2}$$

$$2fy = -y \quad f = -\frac{1}{2}$$

$$c = 4$$

Equation of a tangent to a circle at point (x_1, y_1) is

$$xx_1 + yy_1 + g(x+x_1) + f(y+y_1) + c = 0 \quad \text{--- (2)}$$

Substituting $x_1 = 1, y_1 = 0, g = -\frac{5}{2}, f = -\frac{1}{2}$ and $c = 4$

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

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

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

multiply through by 2

$$2x - 5x - 5 - y + 8 = 0$$

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

~~$-13x - y + 7$ multiply by~~

27. Find the equation of the tangent at the point $(1, 0)$ on the circle $x^2 + y^2 - 12x - 12y + 47 = 0$

Solution -

Comparing general equation of a circle

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

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

$$2gx = -12x, \quad 2fy = -12y$$

$$g = -6$$

$$f = -6$$

$$c = 47$$

Equation of a tangent to a circle at point (x_1, y_1) is

$$xx_1 + yy_1 + g(x+x_1) + f(y+y_1) + c = 0 \quad \text{--- (1)}$$

substituting $x_1 = 1, y_1 = 0, g = -6, f = -6$ and $c = 47$ in (1)

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

$$x - 6x - 6 - 6y + 47 = 0$$

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

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

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

Solution -

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

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

Comparing, $2gx = -8x, \quad 2fy = 14y$

$$g = -4$$

$$f = 7$$

$$c = 40$$

Equation of a tangent to a circle at point (x_1, y_1) is

$$xx_1 + yy_1 + g(x+x_1) + f(y+y_1) + c = 0$$

~~Comparing to given circle~~

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

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

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