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Computer Engineering
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MAT 102

Assignment

1 $x^2 + y^2 + 2gx + 2fy + c = 0 \Rightarrow$ General equation of a circle

$x^2 + y^2 - 5x - y + 4 = 0$ at point $(1, 0)$

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

$2gx = -5x \qquad g = -5/2$

$2fy = -y \qquad f = -1/2$

$C = 4$

Equation of a tangent to a circle at point $(1, 0)$

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

$x_1 = 1 \qquad g = -5/2$

$y_1 = 0 \qquad f = -1/2 \qquad C = 4$

$x - 5/2(x + 1) - 1/2(y + 0) + 4 = 0$

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

Multiplying all through by 2 is :-

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

$-3x - y + 3 = 0$

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

General equation of a circle

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

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

$2gx = -12x \qquad g = -6$

$2fg = - \qquad g = -6$

Equation of a tangent

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

$x_1 = 1 \quad g = -6 \quad C = 47$

$y_1 = 0 \quad f = -6$

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

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

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

3 Find the equation of the ~~circle~~ tangent at point $(1, 0)$ on the circle $x^2 + y^2 - 8x + 14y + 40 = 0$

Solution

$x^2 + y^2 + 2gx + 2fy + c = 0 \Rightarrow$ General equation of a circle

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

Comparing, $2gx = -8x \quad g = -4 \quad C = 40$

$2fy = 14 \quad f = 7$

Equation of a tangent

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

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

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

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