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MECHATRONICS ENGINEERING
19/ENG05/020
Dr. Oyelami / Mr. Okunlola's class

1. $x - y - 14 = 0$ $\qquad$ $x^2 + y^2 - 6x + 8y = 0$

$x - y = 14$

$x = 14 + y$ — ① $\qquad$ By putting ① in ↑

$(14+y)^2 + y^2 - 6(14+y) + 8y = 0$

$196 + 28y + y^2 + y^2 - 84 - 6y + 8y = 0$

$y^2 + y^2 + 8y - 6y + 28y + 196 - 84 = 0$

$2y^2 + 30y + 112 = 0$ $\qquad$ ÷BS 2

$y^2 + 15y + 56 = 0$

$(y+7)(y+8) = 0$

$y = -7$ or $y = -8$

If $y = -7$ or if $y = -8$

$x = 14 + -7$ $\qquad$ $x = 14 + -8$

$x = 7$ $\qquad$ $x = 6$

∴ The points of intersection are $(7, -7)$ & $(6, -$

2. $2x + y - 10 = 0$ $\qquad$ ~~$x^2 + y^2 + 4x - 6$~~

$y = 10 - 2x$ $\qquad$ $x^2 + y^2 + 4x - 6y =$

By Substitution

$x^2 + (10-2x)^2 + 4x - 6(10-2x) = 0$

$x^2 + (10-2x)^2 + 4x - 6(10-2x) = 0$

$x^2 + 100 - 40x + 4x^2 + 4x - 60 + 12x = 0$

$x^2 + 4x^2 - 40x + 4x + 12x + 100 - 60 = 0$

$5x^2 - 24x + 40 = 0$

$x = \frac{12}{5} + \frac{2\sqrt{14}}{5} i$ or $x = \frac{12}{5} - \frac{2\sqrt{14}}{5}$

Since the values of $x$ are imaginary, the line does not intersect with the circle.

$x - 5y - 2 = 0$ $\qquad$ $x^2 + 25y^2 - 6xy - 16 = 0$

$x = 5y + 2$ — ① By substitution

$(5y+2)^2 + 25y^2 - 6(5y+2)y - 16 = 0$

$25y^2 + 20y + 4 + 25y^2 - 30y^2 - 12y - 16 = 0$

$25y^2 + 25y^2 - 30y^2 + 20y - 12y - 16 + 4 = 0$

$20y^2 + 8y - 12 = 0$ $\qquad$ DBS 4

$5y^2 + 2y - 3 = 0$

$(5y - 3)(y + 1) = 0$

$y = 3/5$ or $y = -1$

If $y = 3/5$

$x = 5(3/5) + 2$

$x = 3 + 2 = 5$

If $y = -1$

$x = 5(-1) + 2$

$x = -5 + 2 = -3$