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ELECT/ELECT ENGINEERING

19/ENG04/055

MAT 102 ASSIGNMENT

1) $x - y - 14 = 0$ $y = x - 14$... (i)

$x^2 + y^2 - 6x + 8y = 0$... (ii)

substitute (i) into (ii)

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

$$x^2 + x^2 - 28x + 196 - 6x + 8x - 112 = 0$$

$$= 2x^2 - 26x + 84 = 0$$

$$= x^2 - 13x + 42 = 0$$

$$= x^2 - 7x - 6x + 42 = 0$$

$$x(x-7) - 6(x-7) = 0$$

$$x = 6 \text{ or } x = 7$$

using equation (i)

when $x = 6$

$$y = 6 - 14, y = -8$$

when $x = 7$

$$y = 7 - 14, y = -7$$

points of intersection

$(6, -8)$ and $(7, -7)$

2) $2x + y - 10 = 0$ $y = 10 - 2x$... (i)

$x^2 + y^2 + 4x - 6y = 0$... (ii)

substitute (i) into (ii)

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

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

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

Using Almighty Formula...

$$\frac{24 + \sqrt{-224}}{10} \quad \text{or} \quad \frac{24 - \sqrt{-224}}{10}$$

Since there are no real roots and hence no values for y , there are no points of intersection

$$3) \quad x - 5y - 2 = 0 \quad x = 5y + 2 \dots \textcircled{1}$$

$$x^2 + 25y^2 - 6xy - 16 = 0 \dots \textcircled{2}$$

substitute $\textcircled{1}$ into $\textcircled{2}$

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

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

$$20y^2 + 8y - 12 = 0$$

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

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

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

$$y = -1 \text{ or } y = 3/5$$

using equation $\textcircled{1}$

$$\text{when } y = -1$$

$$x = -5 + 2, \quad x = -3$$

$$\text{when } y = 3/5$$

$$x = 3 + 2, \quad x = 5$$

points of intersection

$$(-3, -1) \text{ and } (5, 3/5)$$