

MAFI 102

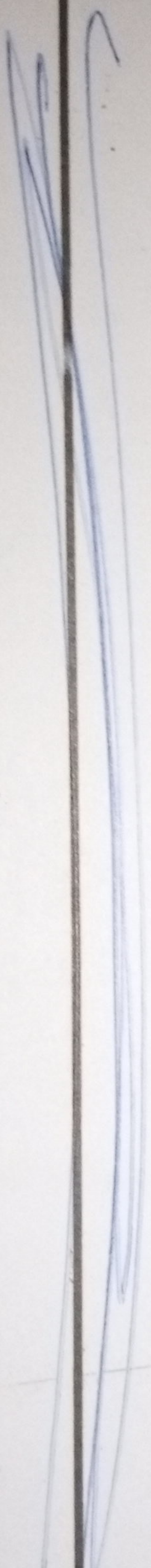
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$$\textcircled{1} \quad x - y - 14 = 0 \quad \& \quad x^2 + y^2 - 6x + 8y = 0$$

$$\text{Solve } \therefore y = -14 + x \quad \therefore y = x - 14$$

$$\therefore \text{Using } x^2 + y^2 - 6x + 8y = 0$$
$$y = x - 14 \quad x^2 + (x - 14)^2 - 6x + 8y = 0$$

$$x^2 + x^2 - 14x - 14x + 196 - 6x + 8x - 112 = 0$$

$$2x^2 - 26x + 84 = 0 \quad \therefore \text{divide through by 2}$$

$$x^2 - 13x + 42 = 0 \quad \therefore x^2 - 7x - 6x + 42 = 0$$

$$\therefore (x^2 - 7x)(-6x + 42) = 0$$

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

$$x - 6 = 0 \quad \text{or} \quad x - 7 = 0 \quad \therefore x = 6 \quad \text{or} \quad x = 7$$

\therefore Therefore substitute in $y = x - 14$

When $x = 6$ When $x = 7$ \therefore

$$\therefore y = 6 - 14$$

$$y = -8$$

$$y = 7 - 14$$

$$y = -7$$

\therefore One point of intersection is $(6, -8)$

$\&$ another point of intersection is $(7, -7)$

$\textcircled{2}$

$$2x + y - 10 = 0 \quad \& \quad x^2 + y^2 + 4x - 6y = 0$$

$$\therefore \text{Solve } y = -2x + 10$$

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

$$x^2 + 4x^2 - 20x - 20x + 100 + 4x + 12x - 60 = 0$$

$$x^2 + 4x^2 - 24x + 40$$

$$\therefore x^2 + 4x^2 - 24x + 40 = 0$$

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

\therefore Using quadratic formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2A}$$

$$x = \frac{-(-24) \pm \sqrt{(-24)^2 - 4(5)(40)}}{2(5)}$$

$$x = \frac{24 \pm \sqrt{576 - 800}}{10} \quad \text{or} \quad x = \frac{24 \pm \sqrt{-224}}{10}$$

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

$$x = 3.89 \approx 4$$

$$x = 0.90 \approx 1$$

\therefore Substituting x in equation $y = -2x + 10$ or $y = (10 - 2x)$

when $x = 4$

when $x = 1$

$$y = 10 - 2(4)$$

$$y = 10 - 2(1)$$

$$y = 2$$

$$y = 8$$

\therefore One point of intersection is $(4, 2)$,

& another point of intersection is $(1, 8)$.

(3)

$$\therefore x - 5y - 2 = 0 \quad \text{and} \quad x^2 + 25y^2 - 6xy - 16 = 0$$

Q.14 $y = \frac{x-2}{5}$

$$x^2 + 25 \left[\frac{x-2}{5} \right]^2 - 6x \left[\frac{x-2}{5} \right] - 16 = 0$$
$$= x^2 + x^2 - 4x + 4 - 6x \left[\frac{x-2}{5} \right] - 16 = 0$$

$$2x^2 - 4x + 4 - \frac{6x^2 + 12x}{5} - 16 = 0$$

Multiply through by 5

$$10x^2 - 20x + 20 - 6x^2 + 12x - 80 = 0$$

$$10x^2 - 6x^2 - 20x + 12x + 20 - 80 = 0$$

$$4x^2 - 8x - 60 = 0$$

divide through by 4 $(4x^2 - 8x - 60) \div 4$

$$x^2 - 2x - 15 = 0$$

$$x^2 - 5x + 3x - 15 = 0$$

$$(x^2 - 5x)(3x - 15) = 0$$

$$x(x-5) \cdot 3(x-5) = 0$$

$$(x+3)(x-5) = 0$$

$$x = -3 \quad \text{or} \quad x = 5$$

\therefore Substitute x in $y = \frac{x-2}{5}$

when $x = -3$ when $x = 5$

$$y = \frac{-3-2}{5}$$

$$y = \frac{5-2}{5}$$

$$y = \frac{-5}{5}$$

$$y = \frac{3}{5}$$

$$y = -1$$

$$y = \frac{3}{5}$$

\therefore The points of intersection are $(-3, -1)$ $(5, \frac{3}{5})$