

Simultaneous Eqns : 1 : Answers

$$\begin{aligned} 1) \quad y &= 4x+1 & - (1) \\ y &= x^2+8x+4 & - (2) \end{aligned}$$

sub (1) into (2)

$$\begin{aligned} 4x+1 &= x^2+8x+4 \\ 0 &= x^2+4x+3 \\ 0 &= (x+3)(x+1) \end{aligned}$$

$$\begin{aligned} \text{either } x+3 &= 0 & \text{or } x+1 &= 0 \\ x &= -3 & x &= -1 \end{aligned}$$

from (1)

$$\begin{aligned} \downarrow \\ y &= 4(-3)+1 \\ y &= -12+1 \\ y &= -11 \end{aligned}$$

$$\therefore \begin{cases} x = -3 \\ y = -11 \end{cases} \text{ Ans}$$

$$\begin{aligned} \swarrow \\ y &= 4(-1)+1 \\ y &= -4+1 \\ y &= -3 \end{aligned}$$

$$\therefore \begin{cases} x = -1 \\ y = -3 \end{cases} \text{ Ans}$$

$$\begin{aligned} 2) \quad y+x &= x^2 & - (1) \\ y-6 &= 4x & - (2) \end{aligned}$$

$$(2) \Rightarrow y = 4x+6 \quad (*)$$

sub into (1)

$$\begin{aligned} 4x+6+x &= x^2 \\ 0 &= x^2-5x-6 \\ 0 &= (x-6)(x+1) \end{aligned}$$

$$\begin{aligned} \text{either } x-6 &= 0 & \text{or } x+1 &= 0 \\ x &= 6 & x &= -1 \end{aligned}$$

from (*)

$$\begin{aligned} \downarrow \\ y &= 4(6)+6 \\ y &= 24+6 \\ y &= 30 \end{aligned}$$

$$\therefore \begin{cases} x = 6 \\ y = 30 \end{cases} \text{ Ans}$$

$$\begin{aligned} \downarrow \\ y &= 4(-1)+6 \\ y &= -4+6 \\ y &= 2 \end{aligned}$$

$$\therefore \begin{cases} x = -1 \\ y = 2 \end{cases} \text{ Ans}$$

$$3) \quad y-10 = x^2 + 3x \quad - (1)$$

$$y-7 = 7x \quad - (2)$$

$$(2) \Rightarrow y = 7x + 7 \quad (*)$$

Sub into (1)

$$7x + 7 - 10 = x^2 + 3x$$

$$0 = x^2 - 4x + 3$$

$$0 = (x-3)(x-1)$$

either $x-3=0$ or $x-1=0$

$$x=3$$

$$x=1$$

from (*)

$$y = 7(3) + 7$$

$$y = 21 + 7$$

$$y = 28$$

$$x=3 \left\{ \begin{array}{l} \text{Ans} \\ y=28 \end{array} \right.$$

$$y = 7(1) + 7$$

$$y = 7 + 7$$

$$y = 14$$

$$x=1 \left\{ \begin{array}{l} \text{Ans} \\ y=14 \end{array} \right.$$

$$4) \quad x^2 + y^2 = 34 \quad - (1)$$

$$y = x + 2 \quad - (2)$$

Sub (2) into (1)

$$x^2 + (x+2)^2 = 34$$

$$x^2 + x^2 + 4x + 4 = 34$$

$$2x^2 + 4x - 30 = 0$$

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

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

either $x+5=0$ or $x-3=0$

$$x = -5$$

$$x = 3$$

from (2)

$$y = -5 + 2$$

$$y = -3$$

$$x = -5 \left\{ \begin{array}{l} \text{Ans} \\ y = -3 \end{array} \right.$$

$$y = 3 + 2$$

$$y = 5$$

$$x = 3 \left\{ \begin{array}{l} \text{Ans} \\ y = 5 \end{array} \right.$$

$$6) \quad \begin{aligned} x^2 + y^2 &= 85 & - (1) \\ 4x + y &= 17 & - (2) \end{aligned}$$

$$(2) \Rightarrow y = 17 - 4x \quad (*)$$

$$(1) \Rightarrow x^2 + (17 - 4x)^2 = 85$$

$$x^2 + 289 - 136x + 16x^2 = 85$$

$$17x^2 - 136x + 204 = 0$$

$$\div 17 \quad x^2 - 8x + 12 = 0$$

$$(x - 6)(x - 2) = 0$$

$$\text{either } x - 6 = 0 \quad \text{or } x - 2 = 0$$

$$x = 6 \quad \quad \quad x = 2$$

from (*)

$$y = 17 - 4(6)$$

$$y = 17 - 24$$

$$y = -7$$

$$x = 6 \quad \left. \begin{aligned} y &= -7 \end{aligned} \right\} \text{ANS}$$

$$y = 17 - 4(2)$$

$$y = 17 - 8$$

$$y = 9$$

$$x = 2 \quad \left. \begin{aligned} y &= 9 \end{aligned} \right\} \text{ANS}$$

WRONG ORDER

~~$$\begin{aligned} x^2 + y^2 &= 85 & - (1) \\ 4x + y &= 17 & - (2) \end{aligned}$$~~

~~$$(2) \Rightarrow y = 17 - 4x$$~~

$$5) \quad \begin{aligned} x^2 + y^2 &= 25 & - (1) \\ 3x - 5 - y &= 0 & - (2) \end{aligned}$$

$$(2) \Rightarrow 3x - 5 = y \quad (*)$$

$$(1) \Rightarrow x^2 + (3x - 5)^2 = 25$$

$$x^2 + 9x^2 - 30x + 25 = 25$$

$$10x^2 - 30x = 0$$

$$x^2 - 3x = 0$$

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

either

$$x = 0 \quad \text{or } x - 3 = 0$$

from (*)



$$x = 3$$

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

$$y = -5$$

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

$$y = 9 - 5 = 4$$

$$x = 0 \quad \left. \begin{aligned} y &= -5 \end{aligned} \right\} \text{ANS}$$

$$x = 3 \quad \left. \begin{aligned} y &= 4 \end{aligned} \right\} \text{ANS}$$

$$7) \quad \begin{array}{l} y + 2x = 4 \quad - (1) \\ y = x^2 + x \quad - (2) \end{array}$$

$$(1) \Rightarrow y = 4 - 2x \quad (*)$$

$$(2) \Rightarrow \begin{array}{l} 4 - 2x = x^2 + x \\ 0 = x^2 + 3x - 4 \\ 0 = (x + 4)(x - 1) \end{array}$$

either

or

$$x + 4 = 0$$

$$x - 1 = 0$$

$$x = -4$$

$$x = 1$$

from (*)



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

$$y = 4 - 2(1)$$

$$y = 4 + 8$$

$$y = 4 - 2$$

$$y = 12$$

$$y = 2$$

$$\left. \begin{array}{l} x = -4 \\ y = 12 \end{array} \right\} \text{ANS}$$

$$\left. \begin{array}{l} x = 1 \\ y = 2 \end{array} \right\} \text{ANS}$$

$$8) \quad \begin{array}{l} x = 2y \quad - (1) \\ x^2 - y^2 + xy = 20 \quad - (2) \end{array}$$

Sub (1) into (2)

$$(2y)^2 - y^2 + xy = 20$$

$$4y^2 - y^2 + (2y)y = 20$$

$$3y^2 + 2y^2 = 20$$

$$5y^2 = 20$$

$$y^2 = 4$$

$$y^2 - 4 = 0$$

$$(y + 2)(y - 2) = 0$$

$$\text{either } y + 2 = 0$$

$$\text{or } y - 2 = 0$$

$$y = -2$$

$$y = 2$$

from (1)



$$x = 2(-2)$$

$$x = 2(2)$$

$$x = -4$$

$$x = 4$$

$$\left. \begin{array}{l} x = -4 \\ y = -2 \end{array} \right\} \text{ANS}$$

$$\left. \begin{array}{l} x = 4 \\ y = 2 \end{array} \right\} \text{ANS}$$

$$9) \quad \begin{aligned} x + 2y &= -3 & \text{--- (1)} \\ x^2 - 2x + 3y^2 &= 11 & \text{--- (2)} \end{aligned}$$

$$(1) \Rightarrow x = -3 - 2y \quad (*)$$

Sub into (2)

$$(-3 - 2y)^2 - 2(-3 - 2y) + 3y^2 = 11$$

$$9 + 12y + 4y^2 + 6 + 4y + 3y^2 = 11$$

$$7y^2 + 16y + 4 = 0$$

$$(7y + 2)(y + 2) = 0$$

either

$$7y + 2 = 0$$

$$\text{or } y + 2 = 0$$

$$y = -2/7$$

$$y = -2$$

from (*)



$$x = -3 - 2(-2/7)$$

$$x = -3 - 2(-2)$$

$$x = -3 + 4/7$$

$$x = -3 + 4$$

$$x = 1$$

$$x = \frac{25}{7}$$

$$\left. \begin{aligned} x &= \frac{25}{7} \\ y &= -\frac{2}{7} \end{aligned} \right\} \text{ANS}$$

$$\left. \begin{aligned} x &= 1 \\ y &= -2 \end{aligned} \right\} \text{ANS}$$

$$10) \quad \begin{aligned} y - 4 &= x & \text{--- (1)} \\ y + x^2 &= 4 & \text{--- (2)} \end{aligned}$$

$$(1) \Rightarrow y = x + 4 \quad (*)$$

sub into (2)

$$x + 4 + x^2 = 4$$

$$x^2 + x = 0$$

$$x(x + 1) = 0$$

either

or

$$x + 1 = 0$$

$$x = 0$$

$$x = -1$$

from (*)



$$y = 0 + 4$$

$$y = -1 + 4$$

$$y = 4$$

$$y = 3$$

$$\left. \begin{aligned} x &= 0 \\ y &= 4 \end{aligned} \right\} \text{ANS}$$

$$\left. \begin{aligned} x &= -1 \\ y &= 3 \end{aligned} \right\} \text{ANS}$$