

EPW-3 (Google search is strictly prohibited)

USE ELIMINATION METHOD

1) Solve for x and y : (i) $7(y+3) - 2(x+2) = 14$ $x=5$
 $4(y-2) + 3(x-3) = 2$ $y=1$

(ii) $2x + 3y = 7$
 $6x + 9y = 11$

(iii) $0.4x + 3y = 1.2$ $x = \frac{1}{2}$
 $7x - 2y = \frac{17}{6}$ $y = \frac{1}{3}$

(iv) Solve for x, y and z : $x + y = 4$ $x = 2$
 $y + z = 1$ $y = 2$
 $z + x = 1$ $z = -1$

(v) $149x - 330y = -511$ $x = 1$
 $-330x + 149y = -32$ $y = 2$

(vi) $\sqrt{7}x + \sqrt{11}y = 0$ $x = 0$
 $\sqrt{3}x - \sqrt{5}y = 0$ $y = 0$

(vii) $\frac{ax}{b} - \frac{by}{a} = a + b$ $x = b$
 $ax - by = 2ab$ $y = -a$

(viii) $(a-b)x + (a+b)y = a^2 - b^2 - 2ab$ $x = a + b$
 $(a+b)(x+y) = a^2 + b^2$ $y = \frac{-2ab}{a+b}$

(ix) $\frac{x}{a} - \frac{y}{b} = 0$ $x = a$
 $ax + by = a^2 + b^2$ $y = b$

(x) $px + qy = p - q$ $x = 1$
 $qx - py = p + q$ $y = -1$

EPW-3 (Answers)

$$1) (i) \quad 7(y+3) - 2(x+2) = 14 \Rightarrow 7y + 21 - 2x - 4 = 14$$

$$\Rightarrow -2x + 7y = 14 - 17$$

$$\Rightarrow -2x + 7y = -3$$

$$\Rightarrow 2x - 7y = 3 \rightarrow (1)$$

$$4(y-2) + 3(x-3) = 2 \Rightarrow 4y - 8 + 3x - 9 = 2$$

$$\Rightarrow 3x + 4y = 2 + 17$$

$$\Rightarrow 3x + 4y = 19 \rightarrow (2)$$

$$(1) \times 3 \Rightarrow 6x - 21y = 9$$

$$(2) \times 2 \Rightarrow 6x + 8y = 38$$

$$-29y = -29$$

$$y = 1$$

From eq: (1), $2x - 7 = 3$

$$2x = 10$$

$$x = 5$$

$$(ii) \quad 2x + 3y = 7 \rightarrow (1)$$

$$6x + 9y = 11 \rightarrow (2)$$

$$(1) \times 3 \Rightarrow 6x + 9y = 21$$

$$(2) \Rightarrow 6x + 9y = 11$$

$0 = 10$, which is a false statement

Hence, the two given equations have no solution.

$$(iii) \quad 0.4x + 3y = 1.2 \Rightarrow 4x + 30y = 12 \rightarrow (1)$$

$$7x - 2y = \frac{17}{6} \xrightarrow{\times 15} 105x - 30y = \frac{17 \times 15}{2}$$

$$109x = 12 + \frac{85}{2}$$

$$109x = \frac{109}{2}$$

$$x = \frac{1}{2}$$

From eq: (1), $2 + 30y = 12$

$$30y = 10$$

$$y = \frac{1}{3}$$

$$(iv) \quad x + y = 4 \rightarrow (1)$$

$$y + z = 1 \rightarrow (2)$$

$$z + x = 1 \rightarrow (3)$$

$$x + y = 4 \rightarrow (1)$$

$$(-) \quad y + z = 1 \rightarrow (2)$$

$$(-), \quad x - z = 3$$

$$(3) \Rightarrow x + z = 1$$

$$(+), \quad 2x = 4$$

$$x = 2$$

$$\text{From eq: (1), } y = 2$$

$$\text{From eq: (2), } z = -1$$

$$(v) \quad 149x - 330y = -511 \rightarrow (1)$$

$$-330x + 149y = -32 \rightarrow (2)$$

$$(1) + (2) \Rightarrow -181x - 181y = -543$$

$$(\div -181) \Rightarrow x + y = 3 \rightarrow (3)$$

$$(1) - (2) \Rightarrow 479x - 479y = -479$$

$$(\div 479) \Rightarrow x - y = -1 \rightarrow (4)$$

$$(3) + (4) \Rightarrow 2x = 2$$

$$x = 1$$

$$\text{From eq: (3), } y = 2$$

$$(vi) \quad \sqrt{7}x + \sqrt{11}y = 0 \Rightarrow \sqrt{7}x = -\sqrt{11}y$$

$$\Rightarrow x = -\frac{\sqrt{11}}{\sqrt{7}}y \rightarrow (1)$$

On substituting x in eq: $\sqrt{3}x - \sqrt{5}y = 0$

$$\rightarrow \sqrt{3}x - \frac{\sqrt{11}}{\sqrt{7}}y - \sqrt{5}y = 0$$

$$\Rightarrow -\sqrt{33}y - \sqrt{35}y = 0$$

$$\Rightarrow y(-\sqrt{33} - \sqrt{35}) = 0$$
$$\boxed{y = 0}$$

From eq: (1), $\boxed{x = 0}$

(vii) $\frac{ax}{b} - \frac{by}{a} = a+b \Rightarrow a^2x - b^2y = ab(a+b) \rightarrow (1)$

$$ax - by = 2ab \rightarrow (2) \Rightarrow \overset{+a}{a^2}x \overset{(-)}{-} \overset{(+)}{aby} = \overset{(-)}{2a^2b} \rightarrow (3)$$

$$(1) - (3) \Rightarrow y(-b^2 + ab) = a^2b + ab^2 - 2a^2b$$

$$by(a-b) = ab^2 - a^2b$$

$$\cancel{by}(a-b) = ab(b-a)$$

$$y(\cancel{a-b}) = -a(\cancel{a-b})$$

$$\boxed{y = -a}$$

From eq: (2), $ax + ab = 2ab$

$$\cancel{ax} = \cancel{ab}$$

$$\boxed{x = b}$$

(viii) $(a-b)x + (a+b)y = a^2 - b^2 - 2ab \rightarrow (1)$

$$\overset{(-)}{(a+b)x} \overset{(-)}{+} \overset{(-)}{(a+b)y} = \overset{(-)}{a^2} - \overset{(-)}{b^2} - 2ab \rightarrow (2)$$

$$(a-b)x - (a+b)x = -2b^2 - 2ab$$

$$x(\cancel{a-b} - \cancel{a-b}) = -2b(b+a)$$

$$\Rightarrow \cancel{-2bx} = \cancel{-2b(a+b)}$$

$$\boxed{x = a+b}$$

From eq: (2), $(a+b)^2 + (a+b)y = a^2 + b^2$

$$\cancel{a^2} + \cancel{b^2} + 2ab + (a+b)y = \cancel{a^2} + \cancel{b^2}$$

$$(a+b)y = -2ab$$

$$\boxed{y = \frac{-2ab}{a+b}}$$

$$(ix) \frac{x}{a} - \frac{y}{b} = 0 \Rightarrow bx - ay = 0 \rightarrow (1)$$

$$ax + by = a^2 + b^2 \rightarrow (2)$$

$$(1) \times b \Rightarrow b^2x - aby = 0$$

$$(2) \times a \Rightarrow a^2x + aby = a^3 + ab^2$$

$$(+), \quad b^2x + a^2x = a^3 + ab^2$$

$$x(a^2 + b^2) = a(a^2 + b^2)$$

$$\boxed{x = a}$$

From eq: (1), $bx - ay = 0$

$$ay = bx$$

$$\boxed{y = b}$$

$$(x) \quad px + qy = p - q \xrightarrow{\times p} p^2x + pqy = p^2 - pq \rightarrow (1)$$

$$qx - py = p + q \xrightarrow{\times q} q^2x - pqy = pq + q^2 \rightarrow (2)$$

$$(+), \quad p^2x + q^2x = p^2 + q^2$$

$$x(p^2 + q^2) = p^2 + q^2$$

$$\boxed{x = 1}$$

From eq: (1), $px + qy = p - q$

$$\boxed{y = -1}$$