

$$1(1) + 2(1) + 3(3) + 4(2) = 10(x)$$

$$\Rightarrow x = 2$$

$$1(1) + 2(7) + 3(1) + 4(3) = 10(y)$$

$$\Rightarrow y = 3$$

Answer: (2, 3)

Q. 3. $3(4) + 2(9) = 5x$

$$\Rightarrow x = 6$$

$$3(1) + 2(-9) = 5y$$

$$\Rightarrow y = 3$$

Answer: (6, -3)

$$3(4) + 2(9) + 1(x) = 6(6)$$

$$\Rightarrow x = 6$$

$$3(1) + 2(-9) + 1(y) = 6(-2)$$

$$\Rightarrow y = 3$$

Answer: (6, 3)

Q. 4. $W(3) + 2W(12) = 3W(x)$

$$\Rightarrow x = 9$$

$$W(1) + 2W(19) = 3W(y)$$

$$\Rightarrow y = 13$$

Answer: (9, 13) = g

$$|pg| = \sqrt{(9 - 3)^2 + (13 - 1)^2}$$

$$= \sqrt{180}$$

$$= 6\sqrt{5}$$

$$|gq| = \sqrt{(12 - 9)^2 + (19 - 13)^2}$$

$$= \sqrt{45} = 3\sqrt{5}$$

$$|pg| : |gq| = 6\sqrt{5} : 3\sqrt{5}$$

$$= 2 : 1$$

Q. 5. $2N$ at (1, 2) }
 $3N$ at (1, 7) } = $10N$ at (x, y)
 $5N$ at (5, -1) }

$$2(1) + 3(1) + 5(5) = 10(x)$$

$$\Rightarrow x = 3$$

$$2(2) + 3(7) + 5(-1) = 10(y)$$

$$\Rightarrow y = 2$$

Answer: $3\vec{i} + 2\vec{j}$

$$\left. \begin{array}{l} 2N \text{ at } (1, 2) \\ 3N \text{ at } (1, 7) \\ 5N \text{ at } (5, -1) \\ 2N \text{ at } (x, y) \end{array} \right\} = 12N \text{ at } (4, 1)$$

$$2(1) + 3(1) + 5(5) + 2(x) = 12(4)$$

$$\Rightarrow x = 9$$

$$2(2) + 3(7) + 5(-1) + 2(y) = 12(1)$$

$$\Rightarrow y = -4$$

Answer: (9, -4)

Q. 6. $1(4) + 2(1) + 3(k) = 6\left(2\frac{1}{2}\right)$

$$k = 3$$

$$1(1) + 2h + 3(1) = 6(4)$$

$$h = 10$$

Q. 7. Centroid of triangle

$$pqr = \left(\frac{2 + 5 + 3}{3}, \frac{1 + 3 - 1}{3} \right)$$

$$= \left(\frac{10}{3}, 1 \right)$$

$$\left. \begin{array}{l} M \text{ at } (2, 1) \\ M \text{ at } (5, 3) \\ M \text{ at } (3, -1) \end{array} \right\} = 3M \text{ at } (x, y)$$

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

$$\Rightarrow x = \frac{10}{3}$$

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

$$\Rightarrow y = 1$$

The centre of gravity is at $\left(\frac{10}{3}, 1\right)$ which is the centroid.

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

$$\Rightarrow x = 0$$

$$M(1) + M(3) + M(-1) + 2M(y) = 5M(1)$$

$$\Rightarrow y = 1$$

Answer: (0, 1)