

Algebraic Expressions

Exercise 6A

Q1

Answer :

(i)

$$\begin{aligned} & 5x + 7x + (-6x) \\ &= 5x + 7x - 6x \\ &= 6x \end{aligned}$$

(ii)

$$\begin{aligned} & \frac{3}{5}x + \frac{2}{3}x + \frac{-4}{5}x \\ &= \frac{9x + 10x - 12x}{15} = \frac{7x}{15} \end{aligned}$$

(iii)

$$\begin{aligned} & 5a^2b + (-8a^2b) + 7a^2b \\ &= 5a^2b - 8a^2b + 7a^2b \\ &= 4a^2b \end{aligned}$$

(iv)

$$\begin{aligned} & \frac{3}{4}x^2 + 5x^2 + (-3x^2) + \left(-\frac{1}{4}x^2\right) \\ &= \frac{3}{4}x^2 - \frac{1}{4}x^2 + 5x^2 - 3x^2 \\ &= \frac{1}{2}x^2 + 2x^2 = \frac{5}{2}x^2 \end{aligned}$$

(v)

$$\begin{aligned} & x - 3y + 4z + y - 2x - 8z + 5x - 2y - 3z \\ &= x - 2x + 5x - 3y + y - 2y + 4z - 8z - 3z \\ &= 4x - 4y - 7z \end{aligned}$$

(vi) Collecting like terms and adding them:

$$\begin{aligned} & 2x^2 - 3y^2 + 5x^2 + 6y^2 + (-3x^2 - 4y^2) \\ &= 2x^2 + 5x^2 - 3x^2 - 3y^2 + 6y^2 - 4y^2 \\ &= 4x^2 - y^2 \end{aligned}$$

(vii) Collecting like terms and adding them:

$$5x - 2x^2 - 8 + 8x^2 - 7x - 9 + 3 + 7x^2 - 2x$$

(viii) Collecting like terms and adding them:

$$\begin{aligned} & \frac{2}{3}a - \frac{4}{5}b + \frac{3}{5}c + \left(-\frac{3}{4}a - \frac{5}{2}b + \frac{2}{3}c\right) + \frac{5}{2}a + \frac{7}{4}b - \frac{5}{6}c \\ & b - \frac{5}{2}b + \frac{7}{4}b + \frac{3}{5}c + \frac{2}{3}c - \frac{5}{6}c \\ & = \frac{(8-9+30)a}{12} + \frac{(-16-50+35)b}{20} + \frac{(18+20-25)c}{30} \\ & = \frac{29}{12}a - \frac{31}{20}b + \frac{13}{30}c \end{aligned}$$

(ix) Collecting like terms and adding them:

$$\begin{aligned} & \frac{8}{5}x + \frac{11}{7}y + \frac{9}{4}xy + \left(-\frac{3}{2}x - \frac{5}{3}y - \frac{9}{5}xy\right) \\ & = \frac{8}{5}x - \frac{3}{2}x + \frac{11}{7}y - \frac{5}{3}y + \frac{9}{4}xy - \frac{9}{5}xy \\ & = \frac{1}{10}x - \frac{2}{21}y + \frac{9}{20}xy \end{aligned}$$

(x) Collecting like terms and adding them:

$$\begin{aligned} & \frac{3}{2}x^3 - \frac{1}{4}x^2 + \frac{5}{3} + \left(-\frac{5}{4}x^3 + \frac{3}{5}x^2 - x + \frac{1}{5}\right) + \left(-x^2 + \frac{3}{8}x - \frac{8}{15}\right) \\ & = \frac{3}{2}x^3 - \frac{5}{4}x^3 - \frac{1}{4}x^2 + \frac{3}{5}x^2 - x^2 - x + \frac{3}{8}x + \frac{5}{3} + \frac{1}{5} - \frac{8}{15} \\ & = \frac{1}{4}x^3 - \frac{13}{20}x^2 - \frac{5}{8}x + \frac{4}{3} \end{aligned}$$

Q2

Answer :

$$\begin{aligned} \text{(i)} & 7xy - (-8xy) \\ & = 7xy + 8xy \\ & = 15xy \end{aligned}$$

$$\begin{aligned} \text{(ii)} & -3x^2 - x^2 \\ & = -4x^2 \end{aligned}$$

$$\begin{aligned} \text{(iii)} & (4y - 5x) - (x - y) \\ & = 4y - 5x - x + y \\ & = 5y - 6x \end{aligned}$$

$$\begin{aligned} \text{(iv)} & (a^2 + b^2 + 2ab) - (a^2 + b^2 - 2ab) \\ & = a^2 - a^2 + b^2 - b^2 + 2ab + 2ab \quad (\text{Collecting like terms and adding them}) \\ & = 4ab \end{aligned}$$

$$\begin{aligned} \text{(v)} & (2x^2 - 3y^2 + 6xy) - (x^2 - y^2) \\ & 2x^2 - x^2 - 3y^2 + y^2 + 6xy \quad (\text{Collecting like terms and adding them}) \\ & = x^2 - 2y^2 + 6xy \end{aligned}$$

$$\begin{aligned} \text{(vi)} & (2z - x - 3y) - (x - y + 3z) \\ & = 2z - 3z - x - x - 3y + y \quad (\text{Collecting like terms and adding them}) \\ & = -z - 2x - 2y \end{aligned}$$

Q4

Answer :

$$\begin{aligned}(8m - 7n + 6p^2) + (-3m - 4n - p^2) \\ = 8m - 3m - 7n - 4n + 6p^2 - p^2 \\ = 5m - 11n + 5p^2\end{aligned}$$

$$\begin{aligned}(2m + 4n - 3p^2) + (-m - n - p^2) \\ = 2m - m + 4n - n - 3p^2 - p^2 \\ = m + 3n - 4p^2\end{aligned}$$

$$\begin{aligned}\text{Now, } (m + 3n - 4p^2) - (5m - 11n + 5p^2) \\ = -4m + 14n - 9p^2\end{aligned}$$

Q5

Answer :

$$(8a - 6a^2 + 9) + (-10a - 8 + 8a^2)$$

Collecting like terms and adding them:

$$\begin{aligned}8a - 10a - 6a^2 + 8a^2 + 9 - 8 \\ = -2a + 2a^2 + 1\end{aligned}$$

$$\begin{aligned}\text{Now, } -3 - (-2a + 2a^2 + 1) \\ = 2a - 2a^2 - 4\end{aligned}$$

Q6

Answer :

Collecting like terms and adding them:

$$\begin{aligned}\text{(i) } 5x + 7x - 9y - y \\ = 12x - 10y\end{aligned}$$

$$\begin{aligned}\text{(ii) } x^2 - \frac{3}{2}x^2 - x - \frac{1}{2}x + \frac{3}{2} \\ = -\frac{1}{2}x^2 - \frac{3}{2}x + \frac{3}{2}\end{aligned}$$

$$\begin{aligned}\text{(iii) } 7 + 7 - 2x - x - 5x + 5y + y - 3y \\ = 14 - 8x - 3y\end{aligned}$$

$$\begin{aligned}\text{(iv) } \frac{1}{3}y^2 + \frac{2}{3}y^2 - 2y^2 - \frac{4}{7}y - \frac{2}{7}y - \frac{1}{7}y + 5 - 2 + 3 \\ = -y^2 - y + 6\end{aligned}$$