

Column Method

$$\begin{array}{r} 8a + 16b \\ -7a + 3b \\ \hline \end{array}$$

$$\text{ANS} = 15a + 12b$$

$$15a + 12b$$

EXERCISE 19(B)

$$1. (i) 3a + 4b + 7c - 5a + 3b - 6c + 4a - 2b - 4c$$

$$= 3a - 5a + 4a + 4b + 3b - 2b + 7c - 6c - 4c$$

$$= (3 + 4 - 5)a + (4 + 3 - 2)b + (7 - 6 - 4)c$$

$$= 2a + 5b - 3c$$

$$(ii) 2x^2 + xy - y^2 - x^2 + 2xy + 3y^2 + 3x^2 - 10xy + 4y^2$$

$$= 2x^2 + 3x^2 - x^2 + xy + 2xy - 10xy - y^2 + y^2 + 4y^2$$

$$= (2 + 3 - 1)x^2 + (1 + 2 - 10)xy + (-1 + 4)y^2$$

$$(iii) x^2 - x + 1 - 5x^2 + 2x - 2 + 3x^2 - 3x + 1$$

$$= x^2 - 5x^2 + 3x^2 - x + 2x - 3x + 1 - 2 + 1$$

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

$$= x^2 - 2x$$

$$(iv) a^2 - ab + bc + 2ab + bc - 2a^2 - 3bc + 3a^2 + ab \quad (ii)$$

$$= a^2 - 2a^2 + 3a^2 - ab + 2ab + ab + bc + bc - 3bc$$

$$= (1 - 2 + 3)a^2 + (-1 + 2 + 1)ab + (1 + 1 - 3)bc$$

$$= 2ab - bc$$

$$(v) 4x^2 + 7 - 3x + 4x - x^2 + 8 - 10 + 5x - 2x^2$$

$$= 4x^2 - x^2 - 2x^2 + 7 + 8 - 10 - 3x + 4x + 5x$$

$$= (4 - 1 - 2)x^2 + (7 + 8 - 10) + (-3 + 4 + 5)x$$

$$= x^2 + 5 + 6x$$

$$(vi) 3x + 4xy - y^2 + xy - 4x + 2y^2 + 3y^2 - xy + 6x$$

$$= 3x - 4x + 6x + 4xy + xy - xy - y^2 + 2y^2 + 3y^2$$

$$= (3 - 4 + 6)x + (4 + 1 - 1)xy + (-1 + 2 + 3)y^2$$

$$= 5x + 4xy + 4y^2$$

$$2. (i) -17x^2 - 2xy + 23y^2 - 9y^2 + 15x^3 + 7xy + 13x^2 + 3y^2 - 4xy$$

$$= -17x^2 + 13x^2 - 2xy + 7xy - 4xy + 23y^2 - 9y^2 + 3y^2 + 15x^3$$

$$= (-17 + 13)x^2 + (-2 + 7 - 4)xy + (+23 - 9 + 3)y^2 + 15x^3$$

$$= -4x^2 + xy + 17y^2 + 15x^3$$

$$\begin{aligned}
 \text{(ii)} \quad & -x^2 - 3xy + 3y^2 + 8 + 3x^2 - 5y^2 - 3 + 4xy - 6xy + 2x^2 - 2y^2 \\
 & = -x^2 + 3x^2 + 2x^2 + 3xy + 4xy - 6xy + 3y^2 - 5y^2 + y^2 + 8 \\
 & \quad - 3 - 2 \\
 & = (-1+3+2)x^2 + (-3+4-6)xy + (3-5+1)y^2 + (8-3-2) \\
 & = 4x^2 - 5xy - 1y^2 + 3
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad & a^3 - 2b^3 + a + b^3 - 2a^3 + b - 2b + 2b^3 - 5a + 4a^3 \\
 & = a^3 - 2a^3 + 4a^3 - 2b^3 + b^3 + 2b^3 + a + b - 2b + b \\
 & = (1-2+4)a^3 + (-2+1+2)b^3 + (1+1-2)a + (2+1)b \\
 & = 3a^3 + b^3 - 4a + 3b
 \end{aligned}$$

$$\begin{aligned}
 3. \text{(i)} \quad & 3a - (a+2b) \\
 & = 3a + a - 2b \\
 & = 4a - 2b
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad & (5x - 3y) - (x + y) \\
 & = 5x - 3y - x - y \\
 & = \cancel{5x} - x - 3y - y \\
 & = 4x - 4y
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad & (8a + 15b) - (3b - 7a) \\
 & = 8a + 15b - 3b + 7a \\
 & = 8a + 7a + 15b - 3b \\
 & = 15a + 12b
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad & (2x + 7y) - (4y - 3x) \\
 & = 2x + 7y - 4y + 3x \\
 & = 2x + 3x + 7y - 4y \\
 & = 5x + 3y
 \end{aligned}$$

$$\begin{aligned} \textcircled{v} 7 - (4a - 5) &= 7 - 4a + 5 \\ &= 7 + 5 - 4a \\ &= 12 - 4a \end{aligned}$$

$$\begin{aligned} \text{(vi)} (6y - 13) - (4 - 7y) &= 6y - 13 - 4 + 7y \\ &= 6y + 7y - 13 - 4 \\ &= 13y - 17 \end{aligned}$$

4. (i) $5a - 3b + 2c$ from $a - 4b - 2c$

$$= 1a - 4b - 2c$$

$$\begin{array}{r} (-) 5a + 3b + 2c \\ - 1a - 4b - 2c \\ \hline \end{array}$$

(ii) $4x - 6y + 3z$ from $12x + 7y - 21z$

$$= ~~4x~~ - 6y + 3z \quad 12x + 7y - 21z$$

$$\begin{array}{r} (-) 4x - 6y + 3z \\ (+) 12x + 7y - 21z \\ \hline \end{array}$$

$$8x + 13y - 24z$$

(iii) $5 - a - 4b + 4c$ from $5a - 7b + 2c$

$$= 5a - 7b + 2c - (5 - a - 4b + 4c)$$

$$= 5a - 7b + 2c - 5 + a + 4b - 4c$$

$$= 5a + a - 7b + 4b + 2c - 4c - 5$$

$$= 6a - 3b - 2c - 5$$

$$\begin{aligned} \text{(iv)} \quad x - y - z - (-8x - 12y + 17z) \\ = x - y - z + 8x + 12y - 17z \\ = x + 8x - y + 12y - z - 17z \\ = 9x + 11y - 18z \end{aligned}$$

$$\begin{aligned} \text{(v)} \quad ab - 2cd + 2ac + bd - (2ab + cd - ac - 2bd) \\ = ab - 2cd + 2ac + bd - 2ab - cd + ac + 2bd \\ = ab - 2ab - 2cd - cd + 2ac + ac + bd + 2bd \\ = -ab - 3cd + 3ac + 3bd \end{aligned}$$

$$5. \text{(i)} \quad bc - ca + ab - (-ab + bc - ca)$$

$$\begin{aligned} = bc - ca + ab + ab + bc + ca \\ = bc - bc - ca + ca + ab + ab \\ = 2ab \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad 3x + 5y - 4z - (5x + 6y - 3z) \\ = 3x + 5y - 4z - 5x - 6y + 3z \\ = 3x - 5x + 5y - 6y - 4z + 3z \\ = -2x - y - z \end{aligned}$$

$$(iii) \frac{1}{2}p - \frac{1}{3}q - \frac{2}{3}r - (-\frac{3}{2}p + q - r)$$

$$= \frac{1}{2}p - \frac{1}{3}q - \frac{2}{3}r + \frac{3}{2}p - q + r$$

$$= \frac{1}{2}p + \frac{3}{2}p - \frac{1}{3}q - q - \frac{2}{3}r + r$$

$$= (\frac{1}{2} + \frac{3}{2})p + (-\frac{1}{3} - 1)q + (-\frac{2}{3} + 1)r$$

$$= 2p - \frac{4}{3}q + \frac{1}{3}r$$

$$(iv) a^2 + a + 1 - (-1 - a + a^2)$$

$$= a^2 + a + 1 - 1 + a - a^2$$

$$= a^2 - a^2 + a + a + 1 - 1$$

$$= 2a$$

$$Q. (x + y - 2z) + (2x - y + z) - (x + y + z)$$

$$= x + y - 2z + 2x - y + z - x - y - z$$

$$= x + 2x - x + y - y - y - 2z + z - z$$

$$= 2x - y - 2z$$

7. $(3a - 2b + 4c) + (3b - 2c) - (a - b - c)$

$= 3a - 2b + 4c + 3b - 2c - a + b + c$

$= 3a - a - 2b + 3b + b + 4c - 2c + c$

$= 2a + 2b + 3c$

8. $(3x - y + z) + (x + y - 3z) - (x - 2y - z)$

$= 3x - y + z + x + y - 3z - x + 2y + z$

$= 3x + x - x - y + y + 2y + z - 3z + z$

$= 3x + 2y - z$

9. $\{(x - 2z) + (x + y + z)\} - \{(x + y) + (x - z)\}$

$= \{x - 2z + x + y + z\} - \{x + y + x - z\}$

$= \{2x + y - z\} - \{2x + y - z\}$

$= 2x + y - z - 2x - y + z$

$= 2x - 2x + y - y - z + z$

$= 0$

$= 0$