

Ex. 6A

Add:

1. $8ab, -5ab, 3ab, -ab$

Solution:

$$8ab + (-5ab) + 3ab + (-ab) = 5ab$$

2. $7x, -3x, 5x, -x, -2x$

Solution:

$$7x + (-3x) + 5x + (-x) + (-2x) = 6x$$

3. $3a - 4b + 4c, 2a + 3b - 8c, a - 6b + c$

Solution:

$$\begin{aligned} &3a - 4b + 4c + 2a + 3b - 8c + a - 6b + c \\ &= 3a + 2a + a - 4b + 3b - 6b + 4c - 8c + c \\ &= 6a - 7b - 3c \end{aligned}$$

4. $5x - 8y + 2z, 3z - 4y - 2x, 6y - z - x$ and $3x - 2z - 3y$

Solution:

$$\begin{aligned} &5x - 8y + 2z + 3z - 4y - 2x + 6y - z - x + 3x - 2z - 3y \\ &= 5x - 2x - x + 3x - 8y - 4y + 6y - 3y + 2z + 3z - z - 2z \\ &= 5x - 9y + 2z \end{aligned}$$

5. $6ax - 2by + 3cz, 6by - 11ax - cz$ and $10cz - 2ax - 3by$

Solution:

$$\begin{aligned} &6ax - 2by + 3cz + 6by - 11ax - cz + 10cz - 2ax - 3by \\ &= 6ax - 11ax - 2ax - 2by + 6by - 3by + 3cz - cz + 10cz \\ &= -7ax + by + 12cz \end{aligned}$$

6. $2x^3 - 9x^2 + 8, 3x^2 - 6x - 5, 7x^3 - 10x + 1$ and $3 + 2x - 5x^2 - 4x^3$

Solution:

$$\begin{aligned} &2x^3 - 9x^2 + 8 + 3x^2 - 6x - 5 + 7x^3 - 10x + 1 + 3 + 2x - 5x^2 - 4x^3 \\ &= 2x^3 + 7x^3 - 4x^3 - 9x^2 + 3x^2 - 5x^2 - 6x - 10x + 2x + 8 - 5 + 1 + 3 \end{aligned}$$

$$= 5x^3 - 11x^2 - 14x + 7$$

7. $6p + 4q - r + 3, 2r - 5p - 6, 11q - 7p + 2r - 1$ and $2q - 3r + 4$

Solution:

$$\begin{aligned} &6p + 4q - r + 3 + 2r - 5p - 6 + 11q - 7p + 2r - 1 + 2q - 3r + 4 \\ &= 6p - 5p - 7p + 4q + 11q + 2q - r + 2r + 2r - 3r + 3 - 6 - 1 + 4 \\ &= -6p + 17q \end{aligned}$$

8. $4x^2 - 7xy + 4y^2 - 3, 5 + 6y^2 - 8xy + x^2$ and $6 - 2xy + 2x^2 - 5y^2$

Solution:

$$\begin{aligned} &4x^2 - 7xy + 4y^2 - 3 + 5 + 6y^2 - 8xy + x^2 + 6 - 2xy + 2x^2 - 5y^2 \\ &= 4x^2 + x^2 + 2x^2 + 4y^2 + 6y^2 - 5y^2 - 7xy - 8xy - 2xy - 3 + 5 + 6 \\ &= 7x^2 + 5y^2 - 17xy + 8 \end{aligned}$$

Subtract:

9. $3a^2b$ from $-5a^2b$

Solution:

$$\begin{aligned} &-5a^2b - 3a^2b \\ &= -8a^2b \end{aligned}$$

10. $-8pq$ from $6pq$

Solution:

$$\begin{aligned} &6pq - (-8pq) \\ &= 6pq + 8pq \\ &= 14pq \end{aligned}$$

11. $-2abc$ from $-8abc$

Solution:

$$\begin{aligned} &-8abc - (-2abc) \\ &= -8abc + 2abc \\ &= -6abc \end{aligned}$$

12. $-16p$ from $-11p$

Solution:

$$\begin{aligned} &-11p - (-16p) \\ &= -11p + 16p \\ &= 5p \end{aligned}$$

13. $2a - 5b + 2c - 9$ from $3a - 4b - c + 6$

Solution:

$$\begin{aligned} & 3a - 4b - c + 6 - (2a - 5b + 2c - 9) \\ &= 3a - 4b - c + 6 - 2a + 5b - 2c + 9 \\ &= 3a - 2a - 4b + 5b - c - 2c + 6 + 9 \\ &= a + b - 3c + 15 \end{aligned}$$

14. $-6p + q + 3r + 8$ from $p - 2q - 5r - 8$

Solution:

$$\begin{aligned} & p - 2q - 5r - 8 - (-6p + q + 3r + 8) \\ &= p - 2q - 5r - 8 + 6p - q - 3r - 8 \\ &= p + 6p - 2q - q - 5r - 3r - 8 - 8 \\ &= 7p - 3q - 8r - 16 \end{aligned}$$

15. $x^3 + 3x^2 - 5x + 4$ from $3x^3 - x^2 + 2x - 4$

Solution:

$$\begin{aligned} & 3x^3 - x^2 + 2x - 4 - (x^3 + 3x^2 - 5x + 4) \\ &= 3x^3 - x^2 + 2x - 4 - x^3 - 3x^2 + 5x - 4 \\ &= 3x^3 - x^3 - x^2 - 3x^2 + 2x + 5x - 4 - 4 \\ &= 2x^3 - 4x^2 + 7x - 8 \end{aligned}$$

16. $5y^4 - 3y^3 + 2y^2 + y - 1$ from $4y^4 - 2y^3 - 6y^2 - y + 5$

Solution:

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

17. $4p^2 + 5q^2 - 6r^2 + 7$ from $3p^2 - 4q^2 - 5r^2 - 6$

Solution:

$$\begin{aligned} & 3p^2 - 4q^2 - 5r^2 - 6 - (4p^2 + 5q^2 - 6r^2 + 7) \\ &= 3p^2 - 4q^2 - 5r^2 - 6 - 4p^2 - 5q^2 + 6r^2 - 7 \\ &= 3p^2 - 4p^2 - 4q^2 - 5q^2 - 5r^2 + 6r^2 - 6 - 7 \\ &= -p^2 - 9q^2 + r^2 - 13 \end{aligned}$$

18. What must be subtracted from $3a^2 - 6ab - 3b^2 - 1$ to get $4a^2 - 7ab - 4b^2 + 1$?

Solution:

$$\begin{aligned}
\text{Required expression} &= 3a^2 - 6ab - 3b^2 - 1 - (4a^2 - 7ab - 4b^2 + 1) \\
&= 3a^2 - 6ab - 3b^2 - 1 - 4a^2 + 7ab + 4b^2 - 1 \\
&= 3a^2 - 4a^2 - 3b^2 + 4b^2 - 6ab + 7ab - 1 - 1 \\
&= -a^2 + b^2 + ab - 2
\end{aligned}$$

19. The two adjacent sides of a rectangle are $5x^2 - 3y^2$ and $x^2 + 2xy$. Find the perimeter.

Solution:

$$\text{Let length of rectangle} = 5x^2 - 3y^2$$

$$\text{Breadth of rectangle} = x^2 + 2xy$$

$$\text{Perimeter of rectangle} = 2(l + b)$$

$$= 2(5x^2 - 3y^2 + x^2 + 2xy)$$

$$= 2(5x^2 + x^2 - 3y^2 + 2xy)$$

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

$$= 12x^2 - 6y^2 + 4xy$$

20. The perimeter of a triangle is $6p^2 - 4p + 9$ and two of its sides are $p^2 - 2p + 1$ and $3p^2 - 5p + 3$. Find the third side of the triangle.

Solution:

$$\text{Perimeter} = 6p^2 - 4p + 9$$

$$\text{First side} = p^2 - 2p + 1$$

$$\text{Second side} = 3p^2 - 5p + 3$$

$$\text{Third side} = \text{Perimeter} - (\text{sum of the two given sides})$$

$$= 6p^2 - 4p + 9 - (p^2 - 2p + 1 + 3p^2 - 5p + 3)$$

$$= 6p^2 - 4p + 9 - (p^2 + 3p^2 - 2p - 5p + 1 + 3)$$

$$= 6p^2 - 4p + 9 - (4p^2 - 7p + 4)$$

$$= 6p^2 - 4p + 9 - 4p^2 + 7p - 4$$

$$= 6p^2 - 4p^2 - 4p + 7p + 9 - 4$$

$$= 2p^2 + 3p + 5$$