

# Fundamental Operations

## EXERCISE 19(A)

### Question 1.

Fill in the blanks :

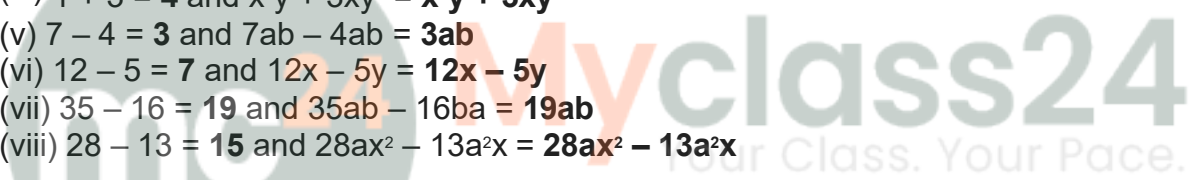
- (i)  $5 + 4 = \dots\dots\dots$  and  $5x + 4x = \dots\dots\dots$
- (ii)  $12 + 18 = \dots\dots\dots$  and  $12x^2y + 18x^2y = \dots\dots\dots$
- (iii)  $7 + 16 = \dots\dots\dots$  and  $7a + 16b = \dots\dots\dots$
- (iv)  $1 + 3 = \dots\dots\dots$  and  $x^2y + 3xy^2 = \dots\dots\dots$
- (v)  $7 - 4 = \dots\dots\dots$  and  $7ab - 4ab = \dots\dots\dots$
- (vi)  $12 - 5 = \dots\dots\dots$  and  $12x - 5y = \dots\dots\dots$
- (vii)  $35 - 16 = \dots\dots\dots$  and  $35ab - 16ba = \dots\dots\dots$
- (viii)  $28 - 13 = \dots\dots\dots$  and  $28ax^2 - 13a^2x = \dots\dots\dots$

**Solution:**

- (i)  $5 + 4 = \mathbf{9}$  and  $5x + 4x = \mathbf{9x}$
- (ii)  $12 + 18 = \mathbf{30}$  and  $12x^2y + 18x^2y = \mathbf{30x^2y}$
- (iii)  $7 + 16 = \mathbf{23}$  and  $7a + 16b = \mathbf{7a + 16b}$
- (iv)  $1 + 3 = \mathbf{4}$  and  $x^2y + 3xy^2 = \mathbf{x^2y + 3xy^2}$
- (v)  $7 - 4 = \mathbf{3}$  and  $7ab - 4ab = \mathbf{3ab}$
- (vi)  $12 - 5 = \mathbf{7}$  and  $12x - 5y = \mathbf{12x - 5y}$
- (vii)  $35 - 16 = \mathbf{19}$  and  $35ab - 16ba = \mathbf{19ab}$
- (viii)  $28 - 13 = \mathbf{15}$  and  $28ax^2 - 13a^2x = \mathbf{28ax^2 - 13a^2x}$

### Question 2.

Fill in the blanks :



- (i) The sum of  $-2$  and  $-5 = \dots\dots\dots$  and the sum of  $-2x$  and  $-5x = \dots\dots\dots$   
 (ii) The sum of  $8$  and  $-3 = \dots\dots\dots$  and the sum of  $8ab$  and  $-3ab = \dots\dots\dots$   
 (iii) The sum of  $-15$  and  $-4 = \dots\dots\dots$  and the sum of  $-15x$  and  $-4y =$

- $\dots\dots\dots$   
 (iv)  $15 + 8 + 3 = \dots\dots\dots$  and  $15x + 8y + 3x = \dots\dots\dots$   
 (v)  $12 - 9 + 15 = \dots\dots\dots$  and  $12ab - 9ab + 15ba = \dots\dots\dots$   
 (vi)  $25 - 7 - 9 =$  and  $25xy - 7xy - 9yx = \dots\dots\dots$   
 (vii)  $-4 - 6 - 5 = \dots\dots\dots$  and  $-4ax - 6ax - 5ay = \dots\dots\dots$

**Solution:**

- (i) The sum of  $-2$  and  $-5 = -7$  and the sum of  $-2x$  and  $-5x = -7x$   
 (ii) The sum of  $8$  and  $-3 = 5$  and the sum of  $8ab$  and  $-3ab = 5ab$   
 (iii) The sum of  $-15$  and  $-4 = -19$  and the sum of  $-15x$  and  $-4y = -15x - 4y$   
 (iv)  $15 + 8 + 3 = 26$  and  $15x + 8y + 3x = 18x + 8y$   
 (v)  $12 - 9 + 15 = 18$  and  $12ab - 9ab + 15ba = 18ab$   
 (vi)  $25 - 7 - 9 = 9$  and  $25xy - 7xy - 9yx = 9xy$   
 (vii)  $-4 - 6 - 5 = -15$  and  $-4ax - 6ax - 5ay = -10ax - 5ay$

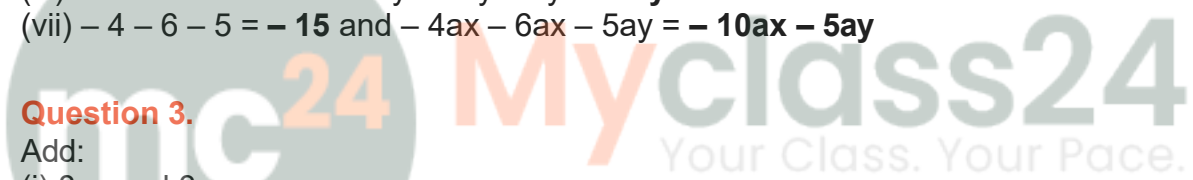
**Question 3.**

Add:

- (i)  $8xy$  and  $3xy$   
 (ii)  $2xyz$ ,  $xyz$  and  $6xyz$   
 (iii)  $2a$ ,  $3a$  and  $4b$   
 (iv)  $3x$  and  $2y$   
 (v)  $5m$ ,  $3n$  and  $4p$   
 (vi)  $6a$ ,  $3a$  and  $9ab$   
 (vii)  $3p$ ,  $4q$  and  $9q$   
 (viii)  $5ab$ ,  $4ba$  and  $6b$   
 (ix)  $50pq$ ,  $30pq$  and  $10pr$   
 (x)  $-2y$ ,  $-y$  and  $-3y$   
 (xi)  $-3b$  and  $-b$   
 (xii)  $5b$ ,  $-4b$  and  $-10b$   
 (xiii)  $-2c$ ,  $-c$  and  $-5c$

**Solution:**

- (i)  $8xy + 3xy = 11xy$   
 (ii)  $2xyz + xyz + 6xyz = (2 + 1 + 6) xyz = 9xyz$



$$(iii) 2a + 3a + 4b$$

$$= (2 + 3) a + 4b$$

$$= 5a + 4b$$

$$(iv) 3x + 2y = 3x + 2y$$

$$(v) 5m + 3n + 4p = 5m + 3n + 4p$$

$$(vi) 6a + 3a + 9ab$$

$$= (6 + 3) a + 9ab$$

$$= 9a + 9ab$$

$$(vii) 3p + 4q + 9q$$

$$= 3p + (4 + 9)q$$

$$= 3p + 13q$$

$$(viii) 5ab + 4ba + 6b$$

$$= (5 + 4) ab + 6b$$

$$= 9ab + 6b$$

$$(ix) 50pq + 30pq + 10pr$$

$$= (50 + 30).pq + 10 pr$$

$$= 80pq + 10pr$$

$$(x) (-2y) + (-y) + (-3y)$$

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

$$= -6y$$

$$(xi) (-3b) + (-b)$$

$$= -(3 + 1)b$$

$$= -4b$$

$$(xii) 5b + (-4b) + (-10b)$$

$$= 5b - (4 + 10)b$$

$$= 5b - 14b = -9b$$

$$(xiii) (-2c) + (-c) + (-5c)$$

$$= -(2 + 1 + 5)c = -8c$$

#### Question 4.

Evaluate :

$$(i) 6a - a - 5a - 2a$$

$$(ii) 2b - 3b - b + 4b$$

$$(iii) 3x - 2x - 4x + 7x$$

$$(iv) 5ab + 2ab - 6ab + ab$$

$$(v) 8x - 5y - 3x + 10y$$

**Solution:**

$$(i) 6a - a - 5a - 2a = 6a - (1 + 5 + 2).a \\ = 6a - 8a = -2a$$

$$(ii) 2b - 3b - b + 4b \\ = 2b + 4b - (3 + 1).b \\ = 6b - 4b = 2b$$

$$(iii) 3x - 2x - 4x + 7x \\ = 3x + 7x - 2x - 4x \\ = (3 + 7).x - (2 + 4).x \\ = 10x - 6x = 4x$$

$$(iv) 5ab + 2ab - 6ab + ab \\ = 5ab + 2ab + ab - 6ab \\ = 8ab - 6ab = 2ab$$

$$(v) 8x - 5y - 3x + 10y \\ = 8x - 3x + 10y - 5y \\ = 5x + 5y$$

### Question 5.

Evaluate :

$$(i) -7x + 9x + 2x - 2x$$

$$(ii) 5ab - 2ab - 8ab + 6ab$$

$$(iii) -8a - 3a + 12a + 13a - 6a$$

$$(iv) 19abc - 11abc - 12abc + 14abc$$

### Solution:

$$(i) -7x + 9x + 2x - 2x \\ = 9x + 2x - 7x - 2x \\ = 11x - 9x = 2x$$

$$(ii) 5ab - 2ab - 8ab + 6ab \\ = 5ab + 6ab - 2ab - 8ab \\ = 11ab - 10ab = ab$$

$$(iii) -8a - 3a + 12a + 13a - 6a \\ = 12a + 13a - (8a + 3a + 6a) \\ = 25a - 17a = 8a$$

$$(iv) 19abc - 11abc - 12abc + 14abc \\ = abc(19 - 11 - 12 + 14) \\ = abc(33 - 23) = 10abc$$

### Question 6.

Subtract the first term from the second :

(i)  $4ab, 6ba$

(ii)  $4 \cdot 8b, 6 \cdot 8b$

(iii)  $3 \cdot 5abc, 10 \cdot 5abc$

(iv)  $3\frac{1}{2}mn, 8\frac{1}{2}nm$

**Solution:**

(i)  $6ba - 4ab = 2ab$

(ii)  $6 \cdot 8b - 4 \cdot 8b = 2b$

(iii)  $10 \cdot 5abc - 3 \cdot 5abc = 7abc$

(iv)  $8\frac{1}{2}nm - 3\frac{1}{2}nm$

$$= \frac{17}{2}nm - \frac{7}{2}nm$$

$$= \frac{17mn - 7mn}{2} = \frac{10mn}{2} = 5mn$$

**Question 7.**

Simplify :

(i)  $2a^2b^2 + 5ab^2 + 8a^2b^2 - 3ab^2$

(ii)  $4a + 3b - 2a - b$

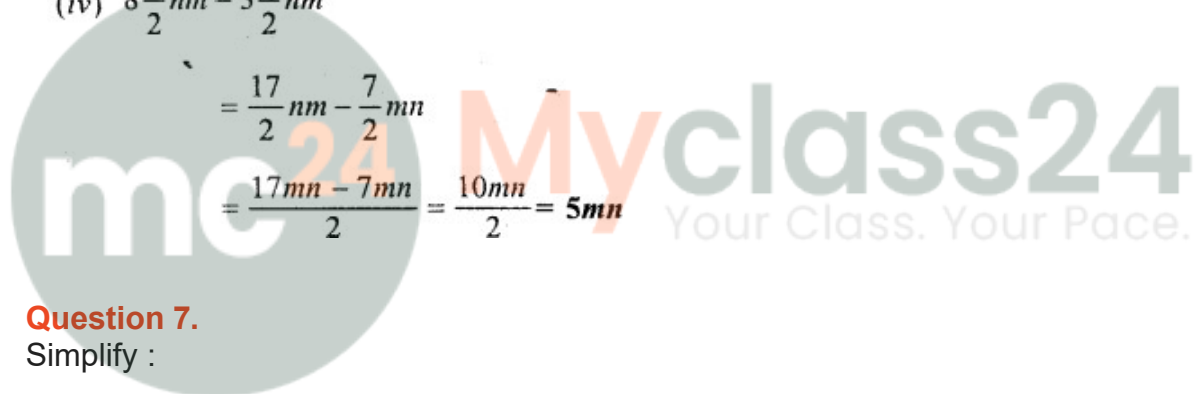
(iii)  $2xy + 4yz + 5xy + 3yz - 6xy$

(iv)  $ab + 15ab - 11ab - 2ab$

(v)  $6a^2 - 3b^2 + 2a^2 + 5b^2 - 4a^2$

(vi)  $8abc + 2ab - 4abc + ab$

(vii)  $9xyz + 15yxz - 10zyx - 2zxy$



$$(viii) 13pqr + 2p + 4q - 6pqr + 5pqr$$

$$(ix) 4ab + 0 - 2ba$$

$$(x) 6x^2y - 2xy^2 + 5x^2y - xy^2$$

$$(xi) 6 \cdot 4a + 5 \cdot 3b - 2 \cdot 4a - 2 \cdot 2b$$

$$(xii) 2 \cdot 5a + 4 \cdot 6b + 1 \cdot 2a - 3 \cdot 6b$$

$$(xiii) 22m - 12 \frac{1}{2}n - 15p + 16n$$

$$(xiv) 6p + \frac{2}{3}q - 1 \frac{1}{2}p + \frac{1}{3}q + 2q$$

$$(xv) 2 \frac{2}{3}xy - 3 \frac{1}{2}xy + 3 \frac{1}{3}xy - 2 \frac{1}{2}xy$$

**Solution:**

$$\begin{aligned}(i) & 2a^2b^2 + 5ab^2 + 8a^2b^2 - 3ab^2 \\ &= 2a^2b^2 + 8a^2b^2 + 5ab^2 - 3ab^2 \\ &= 10a^2b^2 + 2ab^2\end{aligned}$$

$$\begin{aligned}(ii) & 4a + 3b - 2a - b \\ &= 4a - 2a + 3b - b \\ &= 2a + 2b\end{aligned}$$

$$\begin{aligned}(iii) & 2xy + 4yz + 5xy + 3yz - 6xy \\ &= 2xy + 5xy - 6xy + 4yz + 3yz \\ &= 7xy - 6xy + 7yz \\ &= x + 7yz\end{aligned}$$

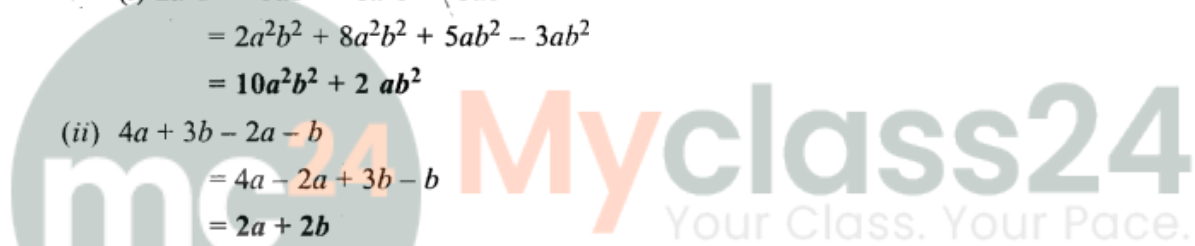
$$\begin{aligned}(iv) & ab + 15ab - 11ab - 2ab \\ &= 16ab - 13ab = 3ab\end{aligned}$$

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

$$\begin{aligned}(vi) & 8abc + 2ab - 4abc + ab \\ &= 8abc - 4abc + 2ab + ab \\ &= 4abc + 3ab\end{aligned}$$

$$\begin{aligned}(vii) & 9xyz + 15yxz - 10zyx - 2zxy \\ &= 9xyz + 15xyz - 10xyz - 2xyz \\ &= 24xyz - 12xyz = 12xyz\end{aligned}$$

$$(viii) 13pqr + 2p + 4q - 6pqr + 5pqr$$



$$= 13pqr + 5pqr - 6pqr + 2p + 4q$$

$$= 12pqr + 2p + 4q$$

$$(ix) \quad 4ab + 0 - 2ba$$

$$= 4ab - 2ab + 0 = 2ab$$

$$(xii) \quad 6x^2y - 2xy^2 + 5x^2y - xy^2$$

$$= 6x^2y + 5x^2y - 2xy^2 - xy^2$$

$$= 11x^2y - 3xy^2$$

$$(xi) \quad 6 \cdot 4a + 5 \cdot 3b - 2 \cdot 4a - 2 \cdot 2b$$

$$= 6 \cdot 4a - 2 \cdot 4a + 5 \cdot 3b - 2 \cdot 2b$$

$$= 4a + 3 \cdot 1b$$

$$(xvii) \quad 2 \cdot 5a + 4 \cdot 6b + 1 \cdot 2a - 3 \cdot 6b$$

$$= 2 \cdot 5a + 1 \cdot 2a + 4 \cdot 6b - 3 \cdot 6b$$

$$= 3 \cdot 7a + b$$

$$(xiii) \quad 22m - 12 \frac{1}{2}n - 15p + 16n$$

$$= 22m - \frac{25}{2}n - 15p + 16n$$

$$= 22m + 16n - \frac{25}{2}n - 15p$$

$$= 22m + \frac{32n - 25n}{2} - 15p$$

$$= 22m + \frac{7n}{2} - 15p$$

$$= 22m + 3 \frac{1}{2}n - 15p$$

$$(xiv) \quad 6p + \frac{2}{3}q - 1 \frac{1}{2}p + \frac{1}{3}q + 2q$$

$$= 6p - \frac{3}{2}p + \frac{2}{3}q + \frac{1}{3}q + 2q$$

$$= \left( \frac{12p - 3p}{2} \right) + \left( \frac{2q + q + 6q}{3} \right)$$

$$= \frac{9}{2}p + 3q = 4 \frac{1}{2}p + 3q$$

$$(xv) \quad 2 \frac{2}{3}xy - 3 \frac{1}{2}xy + 3 \frac{1}{3}xy - 2 \frac{1}{2}xy$$



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$$= xy \left( 2\frac{2}{3} - 3\frac{1}{2} + 3\frac{1}{3} - 2\frac{1}{2} \right)$$

$$= xy \left( \frac{8}{3} - \frac{7}{2} + \frac{10}{3} - \frac{5}{2} \right)$$

$$= xy \left( \frac{16 - 21 + 20 - 15}{6} \right)$$

$$= xy \left( \frac{36 - 36}{6} \right) = 0 \times xy = 0$$



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