

EXERCISE 11B

1. Fill in the blanks:

(i) $8x + 5x = \dots\dots$

(ii) $8x - 5x = \dots\dots$

(iii) $6xy^2 + 9xy^2 = \dots\dots$

(iv) $6xy^2 - 9xy^2 = \dots\dots$

(v) The sum of $8a$, $6a$ and $5b = \dots\dots$

(vi) The addition of 5 , $7xy$, 6 and $3xy = \dots\dots$

(vii) $4a + 3b - 7a + 4b = \dots\dots$

(viii) $-15x + 13x + 8 = \dots\dots$

(ix) $6x^2y + 13xy^2 - 4x^2y + 2xy^2 = \dots\dots$

(x) $16x^2 - 9x^2 = \dots\dots$ and $25xy^2 - 17xy^2 = \dots\dots$

Solution:

(i) $8x + 5x = 13x$

(ii) $8x - 5x = 3x$

(iii) $6xy^2 + 9xy^2 = 15xy^2$

(iv) $6xy^2 - 9xy^2 = -3xy^2$

(v) The sum of $8a$, $6a$ and $5b = 14a + 5b$

It can be written as

$8a + 6a + 5b = 14a + 5b$

(vi) The addition of 5 , $7xy$, 6 and $3xy = 11 + 10xy$

It can be written as

$5 + 7xy + 6 + 3xy = 11 + 10xy$

(vii) $4a + 3b - 7a + 4b = 7b - 3a$

It can be written as

$4a + 3b - 7a + 4b = (4 - 7)a + (3 + 4)b$

$= -3a + 7b$

(viii) $-15x + 13x + 8 = 8 - 2x$

It can be written as

$-15x + 13x + 8 = (-15 + 13)x + 8 = -2x + 8$

(ix) $6x^2y + 13xy^2 - 4x^2y + 2xy^2 = 2x^2y + 15xy^2$

It can be written as

$6x^2y + 13xy^2 - 4x^2y + 2xy^2 = (6 - 4)x^2y + (13 + 2)xy^2$

$= 2x^2y + 15xy^2$

(x) $16x^2 - 9x^2 = 7x^2$ and $25xy^2 - 17xy^2 = 8xy^2$

2. Add:

(i) $-9x$, $3x$ and $4x$

(ii) $23y^2$, $8y^2$ and $-12y^2$

(iii) $18pq$, $-15pq$ and $3pq$

Solution:

(i) $-9x$, $3x$ and $4x$

It can be written as

$$= -9x + 3x + 4x$$

So we get

$$= 9x + 7x$$

$$= -2x$$

(ii) $23y^2$, $8y^2$ and $-12y^2$

It can be written as

$$= 23y^2 + 8y^2 - 12y^2$$

So we get

$$= 31y^2 - 12y^2$$

$$= 19y^2$$

(iii) $18pq$, $-15pq$ and $3pq$

It can be written as

$$= 18pq - 15pq + 3pq$$

So we get

$$= 3pq + 3pq$$

$$= 6pq$$

3. Simplify:

(i) $3m + 12m - 5m$

(ii) $7n^2 - 9n^2 + 3n^2$

(iii) $25zy - 8zy - 6zy$

(iv) $-5ax^2 + 7ax^2 - 12ax^2$

(v) $-16am + 4mx + 4am - 15mx + 5am$

Solution:

(i) $3m + 12m - 5m$

It can be written as

$$= 15m - 5m$$

So we get

$$= 10m$$

(ii) $7n^2 - 9n^2 + 3n^2$

It can be written as

$$= (7 + 3) n^2 - 9n^2$$

So we get

$$= 10n^2 - 9n^2$$

$$= n^2$$

(iii) $25zy - 8zy - 6zy$

It can be written as

$$= 25zy - 14zy$$

So we get

$$= 11zy$$

(iv) $-5ax^2 + 7ax^2 - 12ax^2$

It can be written as
 $= (-5 - 12) ax^2 + 7ax^2$

So we get
 $= -17ax^2 + 7ax^2$
 $= -10ax^2$

(v) $-16am + 4mx + 4am - 15mx + 5am$

It can be written as
 $= (-16 + 4 + 5) am + (4 - 15) mx$

So we get
 $= -7am - 11mx$

4. Add:

(i) $a + b$ and $2a + 3b$

(ii) $2x + y$ and $3x - 4y$

(iii) $-3a + 2b$ and $3a + b$

(iv) $4 + x$, $5 - 2x$ and $6x$

Solution:

(i) $a + b$ and $2a + 3b$

It can be written as
 $= a + b + 2a + 3b$

So we get
 $= a + 2a + b + 3b$
 $= 3a + 4b$

(ii) $2x + y$ and $3x - 4y$

It can be written as
 $= 2x + y + 3x - 4y$

So we get
 $= 2x + 3x + y - 4y$
 $= 5x - 3y$

(iii) $-3a + 2b$ and $3a + b$

It can be written as
 $= -3a + 2b + 3a + b$

So we get
 $= -3a + 3a + 2b + b$
 $= 3b$

(iv) $4 + x$, $5 - 2x$ and $6x$

It can be written as
 $= 4 + x + 5 - 2x + 6x$

So we get
 $= x - 2x + 6x + 4 + 5$
 $= 5x + 9$

5. Find the sum of:

(i) $3x + 8y + 7z$, $6y + 4z - 2x$ and $3y - 4x + 6z$



(ii) $3a + 5b + 2c$, $2a + 3b - c$ and $a + b + c$

(iii) $4x^2 + 8xy - 2y^2$ and $8xy - 5y^2 + x^2$

(iv) $9x^2 - 6x + 7$, $5 - 4x$ and $6 - 3x^2$

(v) $5x^2 - 2xy + 3y^2$, $-2x^2 + 5xy + 9y^2$ and $3x^2 - xy - 4y^2$

Solution:

(i) $3x + 8y + 7z$, $6y + 4z - 2x$ and $3y - 4x + 6z$

It can be written as

$$= 3x + 8y + 7z + 6y + 4z - 2x + 3y - 4x + 6z$$

By further calculation

$$= 3x - 2x - 4x + 8y + 6y + 3y + 7z + 4z + 6z$$

So we get

$$= 3x - 6x + 17y + 17z$$

$$= -3x + 17y + 17z$$

(ii) $3a + 5b + 2c$, $2a + 3b - c$ and $a + b + c$

It can be written as

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

By further calculation

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

So we get

$$= 6a + 9b + 3c - c$$

$$= 6a + 9b + 2c$$

(iii) $4x^2 + 8xy - 2y^2$ and $8xy - 5y^2 + x^2$

It can be written as

$$= 4x^2 + 8xy - 2y^2 + 8xy - 5y^2 + x^2$$

By further calculation

$$= 4x^2 + x^2 + 8xy + 8xy - 2y^2 - 5y^2$$

So we get

$$= 5x^2 + 16xy - 7y^2$$

(iv) $9x^2 - 6x + 7$, $5 - 4x$ and $6 - 3x^2$

It can be written as

$$= 9x^2 - 6x + 7 + 5 - 4x + 6 - 3x^2$$

By further calculation

$$= 9x^2 - 3x^2 - 6x - 4x + 7 + 5 + 6$$

So we get

$$= 6x^2 - 10x + 18$$

(v) $5x^2 - 2xy + 3y^2$, $-2x^2 + 5xy + 9y^2$ and $3x^2 - xy - 4y^2$

It can be written as

$$= 5x^2 - 2xy + 3y^2 - 2x^2 + 5xy + 9y^2 + 3x^2 - xy - 4y^2$$

By further calculation

$$= 5x^2 - 2x^2 + 3x^2 - 2xy + 5xy - xy + 3y^2 + 9y^2 - 4y^2$$

So we get

$$= 6x^2 + 2xy + 8y^2$$

6. Find the sum of:

(i) x and $3y$

- (ii) $-2a$ and $+5$
(iii) $-4x^2$ and $+7x$
(iv) $+4a$ and $-7b$
(v) x^3 , $3x^2y$ and $2y^2$
(vi) 11 and $-by$

Solution:

- (i) x and $3y$

The sum of x and $3y$ is $x + 3y$.

- (ii) $-2a$ and $+5$

The sum of $-2a$ and $+5$ is $-2a + 5$.

- (iii) $-4x^2$ and $+7x$

The sum of $-4x^2$ and $+7x$ is $-4x^2 + 7x$.

- (iv) $+4a$ and $-7b$

The sum of $+4a$ and $-7b$ is $+4a - 7b$.

- (v) x^3 , $3x^2y$ and $2y^2$

The sum of x^3 , $3x^2y$ and $2y^2$ is $x^3 + 3x^2y + 2y^2$.

- (vi) 11 and $-by$

The sum of 11 and $-by$ is $11 - by$.

7. The sides of a triangle are $2x + 3y$, $x + 5y$ and $7x - 2y$. Find its perimeter.

Solution:

It is given that

Sides of a triangle are $2x + 3y$, $x + 5y$ and $7x - 2y$

We know that

Perimeter = Sum of all three sides of a triangle

Substituting the values

$$= 2x + 3y + x + 5y + 7x - 2y$$

By further calculation

$$= 2x + x + 7x + 3y + 5y - 2y$$

So we get

$$= 10x + 8y - 2x$$

$$= 10x + 6y$$

8. The two adjacent sides of a rectangle are $6a + 9b$ and $8a - 4b$. Find its perimeter.

Solution:

It is given that

Sides of a rectangle are $6a + 9b$ and $8a - 4b$

So length = $6a + 9b$ and breadth = $8a - 4b$

We know that

Perimeter = 2 (length + breadth)

Substituting the values

$$= 2 (6a + 9b + 8a - 4b)$$

By further calculation

$$= 2(14a + 5b)$$

So we get

$$= 28a + 10b$$

9. Subtract the second expression from the first:

(i) $2a + b$, $a + b$

(ii) $-2b + 2c$, $b + 3c$

(iii) $5a + b$, $-6b + 2a$

(iv) $a^3 - 1 + a$, $3a - 2a^2$

(v) $p + 2$, 1

Solution:

(i) $2a + b$, $a + b$

It can be written as

$$= (2a + b) - (a + b)$$

So we get

$$= 2a + b - a - b$$

$$= 2a - a + b - b$$

$$= a$$

(ii) $-2b + 2c$, $b + 3c$

It can be written as

$$= (-2b + 2c) - (b + 3c)$$

So we get

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

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

$$= -3b - c$$

(iii) $5a + b$, $-6b + 2a$

It can be written as

$$= (5a + b) - (-6b + 2a)$$

So we get

$$= 5a + b + 6b - 2a$$

$$= 5a - 2a + b + 6b$$

$$= 3a + 7b$$

(iv) $a^3 - 1 + a$, $3a - 2a^2$

It can be written as

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

So we get

$$= a^3 - 1 + a - 3a + 2a^2$$

$$= a^3 + 2a^2 + a - 3a - 1$$

$$= a^3 + 2a^2 - 2a - 1$$

(v) $p + 2$, 1

It can be written as

$$= p + 2 - 1$$

So we get

$$= p + 1$$

10. Subtract:

(i) $4x$ from $8 - x$

(ii) $-8c$ from $c + 3d$

(iii) $-5a - 2b$ from $b + 6c$

(iv) $4p + p^2$ from $3p^2 - 8p$

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

Solution:

(i) $4x$ from $8 - x$

It can be written as

$$= (8 - x) - 4x$$

By further calculation

$$= 8 - x - 4x$$

$$= 8 - 5x$$

(ii) $-8c$ from $c + 3d$

It can be written as

$$= (c + 3d) - (-8c)$$

By further calculation

$$= c + 3d + 8c$$

$$= 9c + 3d$$

(iii) $-5a - 2b$ from $b + 6c$

It can be written as

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

By further calculation

$$= b + 6c + 5a + 2b$$

$$= 5a + 3b + 6c$$

(iv) $4p + p^2$ from $3p^2 - 8p$

It can be written as

$$= (3p^2 - 8p) - (4p + p^2)$$

By further calculation

$$= 3p^2 - 8p - 4p - p^2$$

$$= 2p^2 - 12p$$

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

It can be written as

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

By further calculation

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

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

11. Subtract $-5a^2 - 3a + 1$ from the sum of $4a^2 + 3 - 8a$ and $9a - 7$.

Solution:

We know that

Sum of $4a^2 + 3 - 8a$ and $9a - 7$ can be written as

$$= 4a^2 + 3 - 8a + 9a - 7$$

By further calculation

$$= 4a^2 + a - 4$$

Here

$$(4a^2 + a - 4) - (-5a^2 - 3a + 1) = 4a^2 + a - 4 + 5a^2 + 3a - 1$$

By further calculation

$$= 4a^2 + 5a^2 + a + 3a - 4 - 1$$

So we get

$$= 9a^2 + 4a - 5$$

12. By how much does $8x^3 - 6x^2 + 9x - 10$ exceed $4x^3 + 2x^2 + 7x - 3$?

Solution:

We know that

$$8x^3 - 6x^2 + 9x - 10 \text{ exceed } 4x^3 + 2x^2 + 7x - 3$$

It can be written as

$$= (8x^3 - 6x^2 + 9x - 10) - (4x^3 + 2x^2 + 7x - 3)$$

By further calculation

$$= 8x^3 - 6x^2 + 9x - 10 - 4x^3 - 2x^2 - 7x + 3$$

So we get

$$= 8x^3 - 4x^3 - 6x^2 - 2x^2 + 9x - 7x - 10 + 3$$

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

13. What must be added to $2a^3 + 5a - a^2 - 6$ to get $a^2 - a - a^3 + 1$?

Solution:

The answer can be obtained by subtracting $2a^3 + 5a - a^2 - 6$ from $a^2 - a - a^3 + 1$

$$= (-a^3 + a^2 - a + 1) - (2a^3 + 5a - a^2 - 6)$$

It can be written as

$$= -a^3 + a^2 - a + 1 - 2a^3 - 5a + a^2 + 6$$

By further calculation

$$= -a^3 - 2a^3 + a^2 + a^2 - a - 5a + 1 + 6$$

$$= -3a^3 + 2a^2 - 6a + 7$$

14. What must be subtracted from $a^2 + b^2 + 2ab$ to get $-4ab + 2b^2$?

Solution:

The answer can be obtained by subtracting $-4ab + 2b^2$ from $a^2 + b^2 + 2ab$

$$= a^2 + b^2 + 2ab - (-4ab + 2b^2)$$

It can be written as

$$= a^2 + b^2 + 2ab + 4ab - 2b^2$$

By further calculation

$$= a^2 + b^2 - 2b^2 + 2ab + 4ab$$

$$= a^2 - b^2 + 6ab$$

15. Find the excess of $4m^2 + 4n^2 + 4p^2$ over $m^2 + 3n^2 - 5p^2$.

Solution:

The answer can be obtained by subtracting $m^2 + 3n^2 - 5p^2$ from $4m^2 + 4n^2 + 4p^2$

$$= (4m^2 + 4n^2 + 4p^2) - (m^2 + 3n^2 - 5p^2)$$

It can be written as

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$$= 4m^2 + 4n^2 + 4p^2 - m^2 - 3n^2 + 5p^2$$

By further calculation

$$= 4m^2 - m^2 + 4n^2 - 3n^2 + 4p^2 + 5p^2$$

$$= 3m^2 + n^2 + 9p^2$$



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