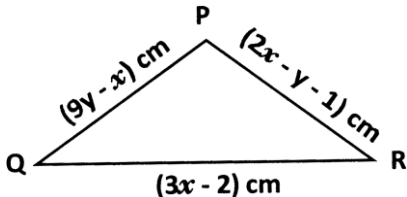


Algebraic Expressions

Multiple Choice Questions

- If $x + y = 5$, $y + z = 7$ and $z + x = 12$, what is the value of $x + y + z$?
 (a) 12 (b) 2
 (c) 5 (d) 24
- How many auxiliary formulae can be formed from the expression in the box?

$$A = \frac{1}{2}h(a + b)$$

 (a) 2 (b) 3
 (c) 4 (d) 1
- What is the difference between $3a + 2b$ and $-2a - 5b$?
 (a) $5a + 7b$ (b) $-5a - 7b$
 (c) $5a - 7b$ (d) $a - 3b$
- The length and breadth of a rectangular plot are l and b . Two rectangular paths each of width w run inside the plot one parallel to the length and the other parallel to the breadth. What is the total area of the paths?
 (a) $(l + w)(b + w) - lb$
 (b) $lb - (l - w)(b - w)$
 (c) $(l + b - w)w$
 (d) $lb - (l - 2w)(b - 2w)$
- In a two digit number, the units digit is x and tens digit is $(x + 3)$. What is the sum of the digits in the number?
 (a) $11x + 3$ (b) $2x + 3$
 (c) $3 + x$ (d) $11x + 30$
- A and B are polynomials and each is the additive inverse of the other. What does it mean?
 (a) $A = B$
 (b) $A + B$ is a zero polynomial.
 (c) $A - B$ is a zero polynomial.
 (d) $A - B = B - A$
- When a certain number, 'm' is divided by 5 and added to 8, the result is equal to thrice the number subtracted from 4. What is the value of 'm'?
 (a) 2 (b) $\frac{4}{3}$
 (c) -1 (d) -5
- 5 added to thrice a number is equal to 12 added to twice the number. What is the number?
 (a) $\sqrt{49} \times \frac{1}{7}$ (b) $\sqrt[3]{343} \times \frac{7}{7}$
 (c) 7 (d) Both (B) and (C)
- In the figure given what is the perimeter, in cm, of the triangle?

 (a) $(8y + 4x - 3)cm$ (b) $(8y - 4x + 3)cm$
 (c) $(14x - 2y - 3)cm$ (d) $(12xy - 3)cm$
- If $C = \frac{x - a}{a - b}$, find the value of x .
 (a) $\frac{bC - a}{C - 1}$ (b) $\frac{C - a}{C - b}$
 (c) $\frac{C + a}{C + b}$ (d) $\frac{1 - C}{a - bC}$

11. Match the following.

	Column-I			Column-II
(i)	$4m^2p, 4mp^2$	()	(a)	Binomial
(ii)	$5 - 3t$	()	(b)	Unlike terms
(iii)	$-7x, \frac{5}{2}x$	()	(c)	Trinomial
(iv)	$1 + x + x^2$	()	(d)	Like terms

- (a) (i) – (a), (ii) – (b), (iii) – (c), (iv) – (d)
 (b) (i), (b), (ii) – (a), (iii) – (d), (iv) – (c)
 (c) (i) – (d), (ii) – (c), (iii) – (b), (iv) – (a)
 (d) (i) – (b), (ii) – (c), (iii) – (a), (iv) – (d)

12. Which of the following is true?

- (a) The product of numbers p and q subtracted from 7 is $7 + pq$.
 (b) $y - y^3$ is a monomial.
 (c) The coefficient of y^2 in $2x^2y + 7y^2$ is 7.
 (d) $100z^3$ is a binomial.

13. If $x = 3, a = (-1)$ and $b = (-2)$, what is the value of $2 - 6x + 4a - 3b$?

- (a) -22 (b) -14
 (c) 12 (d) 14

14. For what value of 'm' is $9 - 5m = (-1)$?

- (a) -1 (b) -2
 (c) 2 (d) 1

15. Simplify $x^2y^3 - 1.5x^2y^3 + 1.4x^2y^3$.

- (a) $0.9x^2y^3$
 (b) $-0.9x^2y^3$
 (c) 0.9
 (d) -0.9

16. What is the value of

$$(a^3 - 2a^2 + 4a - 5) - (-a^3 - 8a + 2a^2 + 5)?$$

- (a) $2a^3 + 7a^2 + 6a - 10$
 (b) $2a^3 + 7a^2 + 12a - 10$
 (c) $2a^3 - 4a^2 + 12a - 10$
 (d) $2a^3 - 4a^2 + 6a - 10$

17. By how much is $x^4 - 4x^2y^2 + y^4$ less than $x^4 + 8x^2y^2 + y^4$?

- (a) $-12x^2y^2$ (b) $12x^2y^2$
 (c) $-12xy$ (d) $12xy$

18. What is the sum of $\frac{a^2}{2} + \frac{b^3}{3} - \frac{c^3}{4}$;

$$\frac{2a^2}{3} + \frac{3b^3}{4} - \frac{4c^3}{5} \text{ and } a^2 + b^3 + c^3?$$

- (a) $\frac{13}{6}a + \frac{25}{12}b^3 - \frac{1}{20}c^3$
 (b) $\frac{13}{6}a^2 - \frac{1}{20}b^3 + \frac{25}{12}c^3$
 (c) $\frac{13}{6}a^2 + \frac{25}{12}b^3 - \frac{1}{20}c^3$
 (d) $\frac{13}{6}b^3 + \frac{25}{12}a^3 + \frac{1}{20}c^3$

19. Match the following.

	Column - I			Column - II
(i)	$a^2 - b^3$ when $a = 3$ and $b = 2$	()	(a)	0
(ii)	$z^3 - 3(z - 10)$ when $z = 10$	()	(b)	-12
(iii)	$x^2 + 2x + 1$ when $x = -1$	()	(c)	1000
(iv)	$5p - 2$ when $p = -2$	()	(d)	1

- (a) $(i)-(d), (ii)-(a), (iii)-(b), (iv)-(c)$
 (b) $(i)-(d), (ii)-(c), (iii)-(b), (iv)-(a)$
 (c) $(i)-(a), (ii)-(b), (iii)-(c), (iv)-(d)$
 (d) $(i)-(d), (ii)-(c), (iii)-(a), (iv)-(b)$

20. Simplify the following expression.

$$x(y-z) - y(z-x) - z(x-y)$$

- (a) $2x(y-z)$ (b) $2y(z-x)$
 (c) $2x(z-y)$ (d) $2z(x-y)$

21. What is the 4th term of a pattern described by the expression $n^2 + 1$?

- (a) 18 (b) 17
 (c) 24 (d) 16

22. The third term of the series $7n + 20$ is 41. What is the 10th term?

- (a) 90 (b) 56
 (c) 63 (d) 87

23. What is the expression related to the pattern 5, 8, 11,.....?

- (a) $2n-1$ (b) $3n+2$
 (c) $4n+1$ (d) n^2-1

24. Which expression gives the predecessor of a natural number 'n'?

- (a) $2n-1$ (b) $n+1$
 (c) $n-1$ (d) $2n+1$

25. If 'n' denotes a natural number, what does '2n' denote?

- (a) A prime number
 (b) An even number
 (c) An odd number
 (d) A composite number

26. For any natural number n, what does $2n+1$ denote?

- (a) An even number
 (b) An odd number
 (c) A composite number
 (d) A prime number

27. Identify the like terms in $21p - 32 - 7p + 20p$.

- (a) $21p, -32$ and $20p$ (b) $-32, -7p$ and $20p$
 (c) $21p, -7p$ and $20p$ (d) $-7p, 21p$, and 32

28. What is the symbolic form of "one-fourth of the product of m and n"?

- (a) $\frac{1}{4}mn$ (b) $\frac{1}{4}(m+n)$
 (c) $\frac{1}{4}(m-n)$ (d) $\frac{1}{4}\frac{m}{n}$

29. What do we call the algebraic terms with same literal coefficients?

- (a) Equivalent (b) Unlike terms
 (c) Constants (d) Like terms

30. What is the coefficient of 'y' in the expression $3xy - 13$?

- (a) $3x$ (b) 3
 (c) -13 (d) Either (A) or (B)

31. Simplify $\frac{3}{4}x - \frac{2}{5}ax - y + \frac{1}{3}ax - \frac{1}{8}x$ and find its value when $a = 3, x = (-2)$ and $y = (-6)$.

- (a) $5\frac{3}{20}$ (b) $3\frac{3}{20}$
 (c) $\frac{13}{20}$ (d) $5\frac{1}{20}$

- 32.** A rectangle is $3p$ cm long and $2p$ cm wide. Find the perimeter of the rectangle when $p = 12$.
- (a) 102 cm (b) 120 cm
(c) 210 cm (d) $10p\text{ cm}$
- 33.** From the sum of $7x - 2y - 3z$ and $3x + 5y - 8z$, take away $x - 3z$.
- (a) $9x - 3y + 8z$ (b) $9x + 3y - 8z$
(c) $9x + 3y + 8z$ (d) $9x - 3y - 8z$
- 34.** The angles of a quadrilateral are $(p + 25)^\circ$, $2p^\circ$, $(2p - 15)^\circ$ and $(p + 20)^\circ$. What is the value of the smallest angle?
- (a) 105° (b) 65°
(c) 115° (d) 65°
- 35.** The sides of a right angled triangle are $2a$ cm, $(2a + 2)$ cm and $(4a - 2)$ cm long. What is the length of the shortest side of the triangle if its perimeter is 24 cm?
- (a) 8 cm (b) 6 cm
(c) 10 cm (d) 3 cm
- 36.** What is the sum of $3y^2 + 5yz$, $-2y^2 - 2yz - z^2$ and $-yz + 2z^2$?
- (a) $y^2 - 2yz + z^2$ (b) $y^2 + 2yz + z^2$
(c) $y^2 - 2yz - z^2$ (d) $-y^2 + 2yz - z^2$
- 37.** Evaluate the expression.
 $p - (p - q) - q(q - p)$
- (a) $p - q$
(b) $-p + q$
(c) $p + q$
(d) $-(p + q)$
- 38.** What is the value of the expression $2x^2y + xy^2 + xy$ for $x = 1$ and $y = 2$?
- (a) -2 (b) -3
(c) -4 (d) -5
- 39.** If $P + \frac{5}{4}(4 - 2P) = -4$, find P .
- (a) -6 (b) 6
(c) 18 (d) -18
- 40.** How is "4 is less than half of x " written in symbolic form?
- (a) $4 > \frac{x}{2}$ (b) $\frac{x - 4}{2}$
(c) $\frac{x}{2} + 4$ (d) $4 < \frac{x}{2}$
- 41.** A basket has 23 oranges and bananas. How many bananas are there in the basket if there are 'p' oranges in it?
- (a) $23p$ (b) $23 - p$
(c) $23 + p$ (d) $p - 23$
- 42.** 'x' packets of 6 sweets each are divided equally among 10 children. How many sweets does each child get?
- (a) $6x$ (b) $6x - 10$
(c) $\frac{3x}{5}$ (d) $3x - 5$
- 43.** The length of a rectangle is $2(x + 6)$ cm, and its width is half its length. What is its perimeter?
- (a) $6(x - 3)$ cm (b) $6(x - 6)$ cm
(c) $3(x + 6)$ cm (d) $(6x + 36)$ cm

44. Simplify $\frac{4}{11}(66x + 44) + \frac{3}{11}(33x - 33)$.

(a) $33x + 7$

(b) $33x - 7$

(c) $33x - 7x$

(d) $33 + 7x$

45. Express in the simplest form.

$\frac{9}{10}(30 + 5t) + \frac{5}{6}(18t - 12)$

(a) $-17 + \frac{39}{2}t$

(b) $17t - \frac{39}{2}$

(c) $\left(17 + \frac{39}{2}t\right)$

(d) $17t + \frac{39}{2}$

Solution

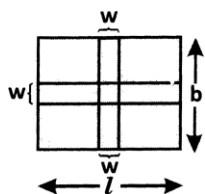
$$\begin{array}{rcl} x + y & = & 5 \\ y + z & = & 7 \\ \hline (A) \quad x + y + z & = & 12 \\ 2(x + y + z) & = & 24 \end{array}$$

$$\Rightarrow x + y + z = 12$$

2. (B) 3 formulae with the three unknowns can be formed from the given expression.

$$\begin{aligned} 3. \quad (A) \quad (3a + 2b) - (-2a - 5b) \\ = 3a + 2b + 2a + 5b = 5a + 7b \end{aligned}$$

4. (C)



Area of the path along length $= l \times w$

Area of the path along breadth $= l \times w$

The common area of the paths $= w^2$

$\therefore$ Total area of the path

$$= lw + lw - w^2 = (l + b - w)w$$

5. (B) Not available

6. (B) Not available

7. (D) Not available

8. (D) Not available

9. (A) Not available

$$10. \quad (A) \quad C = \frac{x-a}{x-b} \Rightarrow C(x-b) = x-a$$

$$\Rightarrow x = \frac{bC - a}{C - 1}$$

11. (B) Not available

12. (C) Not available

13. (B) Not available

14. (C) Not available

15. (A) Not available

16. (C)

$$\begin{array}{rcl} a^3 - 2a^3 + 4a - 5 \\ (-) - a^3 + 2a^2 - 8a + 5 \\ \hline \quad + \quad - \quad + \quad - \\ \hline 2a^3 - 4a^2 + 12a - 10 \end{array}$$

17. (B)

$$\begin{array}{rcl} x^4 + 8x^2y^2 + y^4 \\ (-) - x^4 - 4x^2y^2 + y^4 \\ \hline \quad - \quad + \quad - \\ \hline 12x^2y^2 \end{array}$$

$$18. \quad (C) \quad \left(\frac{a^2}{2} + \frac{b^3}{3} - \frac{c^3}{4} \right) + \left(\frac{2a^2}{3} + \frac{3b^3}{4} - \frac{4c^3}{5} \right)$$

$$+ (a^2 + b^3 + c^3)$$

$$= \frac{13}{6}a^2 + \frac{25}{12}b^3 - \frac{1}{20}c^3$$

19. (D) Substitute the given values in the expressions and evaluate.

$$a^3 - b^3 = 3^3 - 2^3 = 9 - 8 = 1$$

$$z^3 - 3(z - 10) = 10^3 - 3(10 - 10)$$

$$= 10^3 - 0 = 1000$$

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

$$= 1 - 2 + 1 = 0$$

$$20. \quad (A) \quad x(y - z) - y(z - x) - z(x - y)$$

$$= xy - xz - yz + xy - zx + yz$$

$$= 2xy - 2zx = 2x(y - z)$$

- 21.** (B) Substitute $n = 4$ in $n^2 + 1$ and simplify.

$$n^2 + 1 = (4)^2 + 1 = 16 + 1 = 17$$

- 22.** (A) Not available

- 23.** (B) Not available

- 24.** (C) Not available

- 25.** (B) $2n + 1$ denotes an even number as it is exactly divisible by 2.

- 26.** (B) denotes an odd number since it leaves a remainder 1 when divided by 2.

- 27.** (C) Like terms have the same literal coefficients.

- 28.** (A) Not available

- 29.** (D) Not available

- 30.** (A) Not available

- 31.** (A) $\frac{3}{4}x - \frac{2}{5}ax - y + \frac{1}{3}ax - \frac{1}{8}x$

$$= \frac{5}{8}x - \frac{1}{15}ax - y$$

When $a = 3$, $x = (-2)$ and $y = (-6)$, the value of the expression is

$$\frac{5}{8}(-2) - \frac{1}{15}(3)(-2) - (-6)$$

$$= \frac{103}{20} = 5\frac{3}{20}$$

- 32.** (B) Perimeter $= 2(l + b)$

$$= 2(3p + 2p)$$

$$= 2(5p) = 10p \text{ cm}$$

$\therefore$ Perimeter when $p = 12 \text{ cm}$ is

$$10(12) = 120 \text{ cm}.$$

- 33.** (B) The required difference $= (7x - 2y - 3z)$

$$+ (3x + 5y - 8z) - (x - 3z)$$

$$= (10x + 3y - 11z) - (x - 3z)$$

$$= 9x + 3y = 8z$$

- 34.** (B) Sum of angles in a quadrilateral is 360° .

$$\Rightarrow 6p + 30^\circ = 360^\circ$$

$$\Rightarrow p = 60^\circ + 5^\circ = 55^\circ$$

$$\therefore (p + 25)^\circ = 90^\circ, 2p^\circ = 130^\circ$$

$$(p + 20)^\circ = 65^\circ + 20^\circ = 85^\circ$$

$\therefore$ The smallest angle is 65° .

- 35.** (B) Perimeter of the triangle

$$= [2a + (2a + 2) + (4a - 2)] \text{ cm}$$

$$\Rightarrow 8a \text{ cm} = 24 \text{ cm} \text{ or } a = 3 \text{ cm}$$

$\therefore$ The length of the shortest side is $2a = 6 \text{ cm}$

- 36.** (B)

$$3y^2 + 5yz$$

$$-2y^2 - 2yz - z^2$$

$$-yz + 2z^2$$

$$y^2 + 2yz + z^2$$

- 37.** (A) Not available

- 38.** (A) Not available

- 39.** (B) Not available

- 40.** (D) Not available

- 41.** (B) Not available

- 42.** (C) Total number of sweets $= 6x$

Number of sweets each child gets

$$= \frac{6x}{10} = \frac{3x}{5}$$

43. (D) Length = $2(x + 6) \text{ cm}$

$$\text{Width} = \frac{1}{2} \times \text{length}$$

$$= \frac{1}{2} \times 2(x + 6) \text{ cm} = (x + 6) \text{ cm}$$

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

$$= 2[2(x + 6) + (x + 6)] \text{ cm}$$

$$= 6x + 36 \text{ cm}$$

44. (A) $\frac{4}{11}(66x + 44) + \frac{3}{11}(33x - 33)$

$$= 33x + 7$$

45. (C) $\frac{9}{10}(30 + 5t) + \frac{5}{6}(18t - 12)$

$$= \left(17 + \frac{39}{2}t\right)$$