CHAPTER 9

ALGEBRIC EXPRESSION AND IDENTITIES

Points to Remember

- Expressions are formed from variables and Constants.
- Expressions that contain exactly one, two and three terms are called monomials, binomials and trinomials respectively.
- Like terms are formed from the same variables and the power of these variables are the same too. Coefficients of like terms need not be the same.
- An identity is an equality. Which is true for all values of the variables in the equality.
- The following are the standard identities :

$$(a + b)^2 = a^2 + 2ab + b^2 \quad ...(i)$$

$$(a - b)^2 = a^2 - 2ab + b^2 \quad ...(ii)$$

$$(a + b)\ (a - b) = a^2 - b^2 \quad ...(iii)$$

$$(x + a)\ (x + b) = x^2 + (a + b)x + ab \quad ...(iv)$$

QUESTIONS

1. Find the product of $9xy^2$ and $4x^3y$.
2. Add : $7xy + 5yz - 3zx$, $-5yz + 3zx$, $-6xy + yz + zx$.
3. Simplify : $(5x^2p)^3$
4. Find the value of $(5x + 7y)$ if $x = 3$ and $y = 2$.
5. Subtract : $9a - 6ab + 3b + 5$ from $12a - 9ab + 5b - 3$.
6. If $x = 3$ and $y = 5$. Find $x^2 + y^2$.
7. Add $ab - bc$, $bc - ca$, $ca - ab$.
8. Identify the coefficients in the algebric expression $3xyz^2 - 2zy$.
9. If $a = 7$ and $b = 3$. Find $a^2 - b^2$.
10. What should be subtracted from $(x + y)^2$ to get $(x^2 + y^2)$.

11. If $a = 5$ and $b = 3$. Find the value of $(x + y)^2 - (x^2 + y^2)$.
12. Multiply and give the answer in simplified form $(z - 6)\ (z - 5)$.
13. What should be added to $a^2 + b^2$ to get $(a - b)^2$.
14. Find the volume of a rectangular box with length, breadth and height respectively $2ax$, $3cy$ and $5gz$.
15. Find the area of a rectangle with length and breadth respectively $5mn$ and $3ns$.
16. Find the value of $47^2 - 43^2$.
17. Find the product of $(3n - 5p)\ (3n + 5p)$
18. How much is $\left(\sqrt{19} + \sqrt{17}\right)\left(\sqrt{19} - \sqrt{17}\right)$?
19. Find $\left(\frac{4}{3}m + \frac{3}{4}n\right)\left(\frac{4}{3}m - \frac{3}{4}n\right)$.
20. Find the value of $\left(\frac{2}{3}m - \frac{3}{2}n\right)^2 + 2mn$.
21. Find $(A + B)\ (A - B)\ (A^2 + B^2)\ (A^4 + B^4)$
22. Find the value of $(29 \times 31) - (30^2 - 1)$.
    [Hint : $(a + b)\ (a - b) = a^2 - b^2$]
23. Simplify : $3x(4x - 5) + 3$. If $x = \frac{1}{2}$.
24. Simplify : $(ab + bc)^2 - 2ab^2c$.
25. Find the square of $(2mn + 3n)$
26. Find $(1 - x^2)$ if $x = 0.1$.
27. Find the product of $(a + b + c)\ (a + b - c)$
28. If $2x - 3y = 5$ and $xy = 4$. Find $4x^2 + 9y^2$.
29. If $2x + 3y = 8$ and $xy = 2$. Find $4x^2 + 9y^2$.
30. Find the product of $3\frac{1}{5} \times 2\frac{4}{5}$.
31. Find the product of $(4m + 3)\ (4m + 1)$
32. Simplify : $(2x + 5)^2 - (2x - 5)^2$.
33. Find the value of : $(a - b)\ (a + b) + (b - c)\ (b + c) + (c - a)\ (c + a)$.
34. Find $(3pq + 4q)^2 - (3pq - 4q)^2$.
35. Find the product of $(t + s^2)\ (t^2 - s)$.
36. Simplify : $(x + y)\ (x^2 - xy + y^2)$
37. Multiply : $(a + 1)\ (a + 2)$

38. If $a = 3$, $b = 4$ and $x = 5$. Find the value of $(x + a)\ (x + b)$,

39. Simplify : $\dfrac{4x^2 - 9y^2}{2x + 3y}$.

40. Simplify : $\dfrac{6.25\,m^2 - 2.25\,n^2}{2.5\,m - 1.5\,n}$.

41. Simplify : $\dfrac{9x^2 + 16y^2 + 24xy}{3x + 4y}$.

42. Simplify : $\dfrac{4m^2 + 9n^2 - 12mn}{2m - 3n}$.

43. Find the value of $(9p - 5q)^2 + 180pq$

44. Find the value of $(3m + 5n)^2 - 60mn$.

45. Find the product of $(xyz - 3)\ (xyz - 2)$.

46. Find the value of $(4.9)^2$.

47. Simplify : $(p^2 + 5)\ (p - 5) + 25$.

48. Simplify : $(m^2 + 9)\ (m^2 - 9) + 81$.

49. Multiply : $(2.5m - 0.5n)\ (2.5m + 0.5n)$.

50. Subtract : $3pq\ (p - q)$ from $4pq\ (p - q)$.

ANSWERS

1.	$36x^4y^3$	2.	$xy + yz + zx$
3.	$125x^6p^3$	4.	29
5.	$3a - 3ab + 2b - 8$	6.	34
7.	0	8.	(3, –2)
9.	40	10.	$2xy$
11.	30	12.	$z^2 - 11z + 30$
13.	$-2ab$	14.	$30\ acgxyz$
15.	$15mn^2s$	16.	360
17.	$9n^2 - 25p^2$	18.	2
19.	$\dfrac{16}{9}m^2 - \dfrac{9}{16}n^2$.	20.	$\dfrac{4}{9}m^2 + \dfrac{9}{4}n^2$.
21.	$A^8 - B^8$.	22.	0
23.	$-\dfrac{3}{2}$.	24.	$a^2b^2 + b^2c^2$
25.	$4m^2n^2 + 12mn^2 + 9n^2$	26.	0.99

27. $a^2 + b^2 + 2ab - c^2$
28. 73
29. 40
30. $\frac{224}{25}$.
31. $16m^2 + 16m + 3$
32. $40x$
33. 0
34. $48pq^2$
35. $t^3 + t^2s^2 - st - s^3$
36. $x^3 + y^3$
37. $a^2 + 3a + 2$
38. 72
39. $2x - 3y$
40. $2.5m + 1.5n$
41. $3x + 4y$
42. $2m - 3n$
43. $(9p + 5q)^2$
44. $(3m - 5n)^2$
45. $x^2y^2z^2 - 5xyz + 6$
46. 24.01
47. $p^3 - 5p^2 + 5p$
48. m^4
49. $6.25m^2 - 0.25n^2$
50. $p^2q - pq^2$

TEST YOUR KNOWLEDGE

1. Identify the coefficients of the algebric expression $2a^2by - 3ay$.
2. Find the value of x if $3x - 9b = 3b$.
3. Simplify : $(3m^2np)^2$
4. Simplify : $(3m + 2n)^2 - (9m^2 + 4n^2)$.
5. Find the product of $(x + y)\ (x - y)\ (x^2 + y^2)$.
6. Find the square of $(3xy + 4yz)$.
7. How much is $\left(\sqrt{13} + \sqrt{11}\right)\left(\sqrt{13} - \sqrt{11}\right)$.
8. Find the volume of a rectangular box with length, breadth and height respectively $3ab$, $4bc$ and $5ca$.
9. Find the product of $(3m + 2)\ (3m + 3)$.
10. Simplify : $(x^2 + 4)\ (x^2 - 4) + 16$.

ANSWERS

1. $(2, -3)$
2. $4b$
3. $9m^4n^2p^2$
4. $12mn$
5. $x^4 - y^4$
6. $9x^2y^2 + 24xy^2z + 16y^2z^2$
7. 2
8. $60a^2b^2c^2$
9. $9m^2 + 15m + 6$
10. x^4