

5. If we subtract $-3x^2y^2$ from x^2y^2 , then we get

- (a) $-4x^2y^2$ (b) $-2x^2y^2$ (c) $2x^2y^2$ (d) $4x^2y^2$

Solution:-

(d) $4x^2y^2$

We have,

The given two monomials are like terms.

$$\begin{aligned} \text{Subtract } -3x^2y^2 \text{ from } x^2y^2 &= x^2y^2 - (-3x^2y^2) \\ &= x^2y^2 + 3x^2y^2 \\ &= x^2y^2 (1 + 3) \\ &= 4x^2y^2 \end{aligned}$$

6. Like term as $4m^3n^2$ is

- (a) $4m^2n^2$ (b) $-6m^3n^2$ (c) $6pm^3n^2$ (d) $4m^3n$

Solution:-

(b) $-6m^3n^2$

Like terms are formed from the same variables and the powers of these variables are also the same. But coefficients of like terms need not be the same.

7. Which of the following is a binomial?

- (a) $7 \times a + a$ (b) $6a^2 + 7b + 2c$
 (c) $4a \times 3b \times 2c$ (d) $6(a^2 + b)$

Solution:-

(d) $6(a^2 + b)$

Expressions that contain exactly two terms are called binomials.

$$\begin{aligned} &= 6(a^2 + b) \\ &= 6a^2 + 6b \end{aligned}$$

8. Sum of $a - b + ab$, $b + c - bc$ and $c - a - ac$ is

- (a) $2c + ab - ac - bc$ (b) $2c - ab - ac - bc$
 (c) $2c + ab + ac + bc$ (d) $2c - ab + ac + bc$

Solution:-

(a) $2c + ab - ac - bc$

We have,

$$\begin{aligned} &= (a - b + ab) + (b + c - bc) + (c - a - ac) \\ &= a - b + ab + b + c - bc + c - a - ac \end{aligned}$$

Now, grouping like terms

$$= (a - a) + (-b + b) + (c + c) + ab - bc - ac$$

$$= 2c + ab - bc - ac$$

9. Product of the following monomials $4p$, $-7q^3$, $-7pq$ is

- (a) $196 p^2q^4$ (b) $196 pq^4$ (c) $-196 p^2q^4$ (d) $196 p^2q^3$

Solution:-

$$\begin{aligned} \text{(a) } 196 p^2q^4 &= 4p \times (-7q^3) \times (-7pq) \\ &= (4 \times (-7) \times (-7)) \times p \times q^3 \times pq \\ &= 196p^2q^4 \end{aligned}$$

10. Area of a rectangle with length $4ab$ and breadth $6b^2$ is

- (a) $24a^2b^2$ (b) $24ab^3$ (c) $24ab^2$ (d) $24ab$

Solution:-

(b) $24ab^3$

We know that, area of rectangle = length \times breadth

$$\begin{aligned} \text{Given, length} &= 4ab, \text{ breadth} = 6b^2 \\ &= 4ab \times 6b^2 \\ &= 24ab^3 \end{aligned}$$

11. Volume of a rectangular box (cuboid) with length = $2ab$, breadth = $3ac$ and height = $2ac$ is

- (a) $12a^3bc^2$ (b) $12a^3bc$ (c) $12a^2bc$ (d) $2ab + 3ac + 2ac$

Solution:-

(a) $12a^3bc^2$

We know that, volume of cuboid = length \times breadth \times height

$$\begin{aligned} \text{Given, length} &= 2ab, \text{ breadth} = 3ac, \text{ height} = 2ac \\ &= 2ab \times 3ac \times 2ac \\ &= (2 \times 3 \times 2) \times ab \times ac \times ac \\ &= 12a^3bc^2 \end{aligned}$$

12. Product of $6a^2 - 7b + 5ab$ and $2ab$ is

- (a) $12a^3b - 14ab^2 + 10ab$ (b) $12a^3b - 14ab^2 + 10a^2b^2$
 (c) $6a^2 - 7b + 7ab$ (d) $12a^2b - 7ab^2 + 10ab$

Solution:-

(b) $12a^3b - 14ab^2 + 10a^2b^2$

Now we have find product of trinomial and monomial,

$$= (6a^2 - 7b + 5ab) \times 2ab$$

$$= (2ab \times 6a^2) - (2ab \times 7b) + (2ab \times 5ab)$$

$$= 12a^3b - 14ab^2 + 10a^2b^2$$

13. Square of $3x - 4y$ is

(a) $9x^2 - 16y^2$

(b) $6x^2 - 8y^2$

(c) $9x^2 + 16y^2 + 24xy$

(d) $9x^2 + 16y^2 - 24xy$

Solution:-

(d) $9x^2 + 16y^2 - 24xy$

As per the condition in the question, $(3x - 4y)^2$

The standard identity $= (a - b)^2 = a^2 - 2ab + b^2$

Where, $a = 3x$, $b = 4y$

Then,

$$(3x - 4y)^2 = (3x)^2 - (2 \times 3x \times 4y) + (4y)^2$$

$$= 9x^2 - 24xy + 16y^2$$

14. Which of the following are like terms?

(a) $5xyz^2, -3xy^2z$

(b) $-5xyz^2, 7xyz^2$

(c) $5xyz^2, 5x^2yz$

(d) $5xyz^2, x^2y^2z^2$

Solution:-

(b) $-5xyz^2, 7xyz^2$

Like terms are formed from the same variables and the powers of these variables are also the same. But coefficients of like terms need not be the same.

15. Coefficient of y in the term $-y/3$ is

(a) -1

(b) -3

(c) $-1/3$

(d) $1/3$

Solution:-

(c) $-1/3$

$-y/3$ can also be written as $y \times (-1/3)$

So, Coefficient of y is $-1/3$

16. $a^2 - b^2$ is equal to

(a) $(a - b)^2$

(b) $(a - b)(a - b)$

(c) $(a + b)(a - b)$

(d) $(a + b)(a + b)$

Solution:-

(c) $(a + b)(a - b)$

$(a^2 - b^2) = (a + b)(a - b)$ is one of the standard identity.

Solution:-

(b) $(r - 7)(r - 3)$

Factorised form of $r^2 - 10r + 21$ is $= r^2 - 7r - 3r + 21$

Take out the common factors,

$$= r(r - 7) - 3(r - 7)$$

Again take out the common factor,

$$= (r - 7)(r - 3)$$

21. Factorised form of $p^2 - 17p - 38$ is

(a) $(p - 19)(p + 2)$

(b) $(p - 19)(p - 2)$

(c) $(p + 19)(p + 2)$

(d) $(p + 19)(p - 2)$

Solution:-

(a) $(p - 19)(p + 2)$

Factorised form of $p^2 - 17p - 38$ is $= p^2 - 19p + 2p - 38$

Take out the common factors,

$$= p(p - 19) + 2(p - 19)$$

Again take out the common factor,

$$= (p - 19)(p + 2)$$

22. On dividing $57p^2qr$ by $114pq$, we get

(a) $\frac{1}{4}pr$

(b) $\frac{3}{4}pr$

(c) $\frac{1}{2}pr$

(d) $2pr$

Solution:-

(c) $\frac{1}{2}pr$

On dividing $57p^2qr$ by $114pq$,It can be expanded as $= (57 \times p \times p \times q \times r) / (114 \times p \times q)$

$$= 57pr/114$$

... [divide both numerator and denominator by 57]

$$= \frac{1}{2}pr$$

23. On dividing $p(4p^2 - 16)$ by $4p(p - 2)$, we get

(a) $2p + 4$

(b) $2p - 4$

(c) $p + 2$

(d) $p - 2$

Solution:-

(c) $p + 2$

On dividing $p(4p^2 - 16)$ by $4p(p - 2)$

$$= (p((2p)^2 - (4)^2)) / (4p(p - 2))$$

$$= ((2p - 4) \times (2p + 4)) / (4(p - 2))$$

Take out the common factors

$$= ((2(p - 2)) \times (2(p + 4))) / (4(p - 2))$$

$$= (4(p - 2)(p + 2)) / (4(p - 2))$$

$$= p + 2$$

24. The common factor of $3ab$ and $2cd$ is

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

Solution:-

(a) 1

Considering the two monomials $3ab$ and $2cd$ there is no common factor except 1.

25. An irreducible factor of $24x^2y^2$ is

- (a) x^2 (b) y^2 (c) x (d) $24x$

Solution:-

(c) x

An irreducible factor is a factor which cannot be expressed further as a product of factors. Such a factorisation is called an irreducible factorisation.

$$24x^2y^2 = 2 \times 2 \times 2 \times 3 \times x \times x \times y \times y$$

Therefore an irreducible factor is x .

26. Number of factors of $(a + b)^2$ is

- (a) 4 (b) 3 (c) 2 (d) 1

Solution:-

(c) 2

Number of factors of $(a + b)^2$ is $= (a + b)(a + b)$ no further factorisation is possible.

27. The factorised form of $3x - 24$ is

- (a) $3x \times 24$ (b) $3(x - 8)$ (c) $24(x - 3)$ (d) $3(x - 12)$

Solution:-

(b) $3(x - 8)$

The factorised form of $3x - 24$ is,

Take out 3 as common,

$$= 3(x - 8)$$

28. The factors of $x^2 - 4$ are

- (a) $(x - 2), (x - 2)$ (b) $(x + 2), (x - 2)$
 (c) $(x + 2), (x + 2)$ (d) $(x - 4), (x - 4)$

Solution:-

(b) $(x + 2), (x - 2)$

The factors of $x^2 - 4$ are,

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

29. The value of $(-27x^2y) \div (-9xy)$ is

- (a) $3xy$ (b) $-3xy$ (c) $-3x$ (d) $3x$

Solution:-

(d) $3x$

$$\begin{aligned}\text{The value of } (-27x^2y) \div (-9xy) &= (-27 \times x \times x \times y) / (-9 \times x \times y) \\ &= (27/9)x \dots \text{ [divide both numerator, denominator by 3]} \\ &= 3x\end{aligned}$$

30. The value of $(2x^2 + 4) \div 2$ is

- (a) $2x^2 + 2$ (b) $x^2 + 2$ (c) $x^2 + 4$ (d) $2x^2 + 4$

Solution:-

(b) $x^2 + 2$

$$\begin{aligned}\text{The value of } (2x^2 + 4) \div 2 &= (2x^2 + 4)/2 \\ &= (2(x^2 + 2))/2 \\ &= x^2 + 2\end{aligned}$$

31. The value of $(3x^3 + 9x^2 + 27x) \div 3x$ is

- (a) $x^2 + 9 + 27x$ (b) $3x^3 + 3x^2 + 27x$
(c) $3x^3 + 9x^2 + 9$ (d) $x^2 + 3x + 9$

Solution:-

(d) $x^2 + 3x + 9$

$$\text{The value of } (3x^3 + 9x^2 + 27x) \div 3x = (3x^3 + 9x^2 + 27x)/3x$$

Takeout $3x$ as common,

$$\begin{aligned}&= 3x(x^2 + 3x + 9)/3x \\ &= x^2 + 3x + 9\end{aligned}$$

32. The value of $(a + b)^2 + (a - b)^2$ is

- (a) $2a + 2b$ (b) $2a - 2b$ (c) $2a^2 + 2b^2$ (d) $2a^2 - 2b^2$

Solution:-

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

$$\begin{aligned}(a + b)^2 + (a - b)^2 &= (a^2 + b^2 + 2ab) + (a^2 + b^2 - 2ab) \\ &= (a^2 + a^2) + (b^2 + b^2) + (2ab - 2ab) \\ &= 2a^2 + 2b^2\end{aligned}$$

33. The value of $(a + b)^2 - (a - b)^2$ is

- (a) $4ab$ (b) $-4ab$ (c) $2a^2 + 2b^2$ (d) $2a^2 - 2b^2$

Solution:-

(a) $4ab$

$$\begin{aligned} \text{The value of } (a + b)^2 - (a - b)^2 &= (a^2 + b^2 + 2ab) - (a^2 + b^2 - 2ab) \\ &= a^2 - a^2 + b^2 - b^2 + 2ab + 2ab \\ &= 4ab \end{aligned}$$

In questions 34 to 58, fill in the blanks to make the statements true:

34. The product of two terms with like signs is a _____ term.

Solution:-

The product of two terms with like signs is a positive term.

Let us assume two like terms are, $3p$ and $2q$

$$\begin{aligned} &= 3p \times 2q \\ &= 6pq \end{aligned}$$

35. The product of two terms with unlike signs is a _____ term.

Solution:-

The product of two terms with unlike signs is a negative term.

Let us assume two unlike terms are, $-3p$ and $2q$

$$\begin{aligned} &= -3p \times 2q \\ &= -6pq \end{aligned}$$

36. $a(b + c) = a \times \underline{\hspace{1cm}} + a \times \underline{\hspace{1cm}}$.

Solution:-

$$\begin{aligned} a(b + c) &= a \times \underline{b} + a \times \underline{c}. && \dots \text{ [by using left distributive law]} \\ &= ab + ac \end{aligned}$$

37. $(a - b) \underline{\hspace{1cm}} = a^2 - 2ab + b^2$

Solution:-

$$\begin{aligned} (a - b) \underline{(a - b)} &= (a - b)^2 = a^2 - 2ab + b^2 \\ (a - b) (a - b) &= a \times (a - b) - b \times (a - b) \\ &= a^2 - ab - ba + b^2 \\ &= a^2 - 2ab + b^2 \end{aligned}$$

38. $a^2 - b^2 = (a + b) \underline{\hspace{1cm}}$.

Solution:-

$$a^2 - b^2 = (a + b) \underline{(a - b)} \quad \dots \text{ [from the standard identities]}$$

39. $(a - b)^2 + \underline{\hspace{2cm}} = a^2 - b^2$

Solution:-

$$\begin{aligned} (a - b)^2 + \underline{(2ab - 2b^2)} &= a^2 - b^2 \\ &= (a - b)^2 + (2ab - 2b^2) \\ &= a^2 + b^2 - 2ab + 2ab - 2b^2 \\ &= a^2 - b^2 \end{aligned}$$

40. $(a + b)^2 - 2ab = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

Solution:-

$$\begin{aligned} (a + b)^2 - 2ab &= \underline{a^2 + b^2} \\ &= (a + b)^2 - 2ab \\ &= a^2 + 2ab + b^2 - 2ab \\ &= a^2 + b^2 \end{aligned}$$

41. $(x + a)(x + b) = x^2 + (a + b)x + \underline{\hspace{2cm}}$.

Solution:-

$$\begin{aligned} (x + a)(x + b) &= x^2 + (a + b)x + \underline{ab} \\ &= (x + a)(x + b) \\ &= x \times (x + b) + a \times (x + b) \\ &= x^2 + xb + xa + ab \\ &= x^2 + x(b + a) + ab \end{aligned}$$

42. The product of two polynomials is a polynomial.

Solution:-

The product of two polynomials is a polynomial.

43. Common factor of $ax^2 + bx$ is $x(ax + b)$.

Solution:-

Common factor of $ax^2 + bx$ is $x(ax + b)$

44. Factorised form of $18mn + 10mnp$ is $2mn(9 + 5p)$.

Solution:-

$$\begin{aligned} \text{Factorised form of } 18mn + 10mnp &\text{ is } \underline{2mn(9 + 5p)} \\ &= (2 \times 9 \times m \times n) + (2 \times 5 \times m \times n \times p) \\ &= 2mn(9 + 5p) \end{aligned}$$

