EXERCISE

In questions 1 to 33, there are four options out of which one is correct. Write the correct answer.

1. The product of a monomial and a binomial is a

(a) monomial **(b) binomial**

(c) trinomial **(d) none of these**

Solution:-

(b) binomial

Let monomial = 2x, binomial = x + y

Then, product of a monomial and a binomial = (2x) × (x + y)

$= 2x^2 + 2xy$

2. In a polynomial, the exponents of the variables are always

(a) integers **(b) positive integers**

(c) non-negative integers **(d) non-positive integers**

Solution:-

(b) positive integers

3. Which of the following is correct?

(a) $(a – b)^2 = a^2 + 2ab – b^2$ **(b) $(a – b)^2 = a^2 – 2ab + b^2$**

(c) $(a – b)^2 = a^2 – b^2$ **(d) $(a + b)^2 = a^2 + 2ab – b^2$**

Solution:-

(b) $(a – b)^2 = a^2 – 2ab + b^2$

We have, = (a - b) × (a - b)

= a × (a - b) – b × (a - b)

$= a^2 – ab – ba + b^2$

$= a^2 – 2ab + b^2$

4. The sum of –7pq and 2pq is

(a) –9pq **(b) 9pq** **(c) 5pq** **(d) – 5pq**

Solution:-

(d) – 5pq

The given two monomials are like terms.

Then sum of -7pq and 2pg = - 7pq + 2pq

= (-7 + 2) pq

= -5pq

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.

Subtract $-3x^2y^2$ from $x^2y^2 = x^2y^2 - (-3x^2y^2)$

$= x^2y^2 + 3x^2y^2$

$= x^2y^2 (1 + 3)$

$= 4x^2y^2$

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.

$= 6 (a^2 + b)$

$= 6a^2 + b$

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,

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

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

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:-

(a) 196 p^2q^4

= 4p × (– $7q^3$) × (–7pq)

= (4 × (-7) × (-7)) × p × q^3 × pq

= $196p^2q^4$

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 × breadth

Given, length = 4ab, breadth = $6b^2$

= 4ab × $6b^2$

= $24ab^3$

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 × breadth × height

Given, length = 2ab, breadth = 3ac, height = 2ac

= 2ab × 3ac × 2ac

= (2 × 3 × 2) × ab × ac × ac

= $12a^3bc^2$

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) × 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 × (-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.

17. Common factor of 17abc, $34ab^2$, $51a^2b$ is

(a) 17abc (b) 17ab (c) 17ac (d) $17a^2b^2c$

Solution:-

(b) 17ab

The given factors can be written in expanded form as,

$17abc = 17 \times a \times b \times c$

$34ab^2 = 2 \times 17 \times a \times b \times b$

$51a^2b = 3 \times 17 \times a \times a \times b$

So, common factors in the above is $17 \times a \times b$

$= 17ab$

18. Square of 9x – 7xy is

(a) $81x^2 + 49x^2y^2$ **(b) $81x^2 - 49x^2y^2$**

(c) $81x^2 + 49x^2y^2 - 126x^2y$ **(d) $81x^2 + 49x^2y^2 - 63x^2y$**

Solution:-

(c) $81x^2 + 49x^2y^2 - 126x^2y$

As per the condition in the question, $(9x - 7xy)^2$

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

Where, a = 9x, b = 7xy

Then,

$(9x - 7xy)^2 = (9x)^2 - (2 \times 9x \times 7xy) + (7xy)^2$

$= 81x^2 - 126x^2y + 49x^2y^2$

19. Factorised form of 23xy – 46x + 54y – 108 is

(a) (23x + 54) (y – 2) **(b) (23x + 54y) (y – 2)**

(c) (23xy + 54y) (– 46x – 108) **(d) (23x + 54) (y + 2)**

Solution:-

(a) (23x + 54) (y – 2)

Factorised form of 23xy – 46x + 54y – 108 is = 23xy – (2 × 23x) + 54y – (2 × 54)

Take out the common factors,

= 23x (y - 2) + 54 (y - 2)

Again take out the common factor,

= (y – 2) (23x + 54)

20. Factorised form of $r^2 - 10r + 21$ is

(a) (r – 1) (r – 4) **(b) (r – 7) (r – 3)**

(c) (r – 7) (r + 3) **(d) (r + 7) (r + 3)**

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) ¼pr **(b) ¾pr** **(c) ½pr** **(d) 2pr**

Solution:-

(c) ½pr

On dividing $57p^2qr$ by 114pq,

It can be expanded as = (57 × p × p × q × r)/(114 × p × q)

= 57pr/114 … [divide both numerator and denominator by 57]

= ½pr

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) × (2p + 4))/(4(p - 2))

Take out the common factors

= ((2(p - 2)) × (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 × 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,
$X^2 - 4 = x^2 - 2^2$
$= (x + 2)(x - 2)$

29. The value of $(-27x^2y) \div (-9xy)$ is
(a) 3xy (b) – 3xy (c) – 3x (d) 3x
Solution:-
(d) 3x
The value of $(-27x^2y) \div (-9xy) = (-27 \times x \times x \times y)/(-9 \times x \times y)$
$= (27/9)x$ … [divide both numerator, denominator by 3]
$= 3x$

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) $x^2 + 2$
The value of $(2x^2 + 4) \div 2 = (2x^2 + 4)/2$
$= (2(x^2 + 2))/2$
$= x^2 + 2$

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) $x^2 + 3x + 9$
The value of $(3x^3 + 9x^2 + 27x) \div 3x = (3x^3 + 9x^2 + 27x)/3x$
Takeout 3x as common,
$= 3x(x^2 + 3x + 9)/3x$
$= x^2 + 3x + 9$

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

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
The value of $(a + b)^2 – (a – b)^2 = (a^2 + b^2 + 2ab) - (a^2 + b^2 – 2ab)$
$= a^2 - a^2 + b^2 - b^2 + 2ab + 2ab$
$= 4ab$

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 <u>positive</u> term.
Let us assume two like terms are, 3p and 2q
$= 3p \times 2q$
$= 6pq$

35. The product of two terms with unlike signs is a __________ term.
Solution:-
The product of two terms with unlike signs is a <u>negative</u> term.
Let us assume two unlike terms are, - 3p and 2q
$= -3p \times 2q$
$= - 6pq$

36. a (b + c) = a × ____ + a × _____.
Solution:-
a (b + c) = a × <u>b</u> + a × <u>c</u>. … [by using left distributive law]
= ab + ac

37. (a – b) __________ = $a^2 – 2ab + b^2$
Solution:-
(a – b) <u>(a - b)</u> = $(a - b)^2 = a^2 – 2ab + b^2$
(a – b) (a - b)= a × (a - b) – b × (a - b)
$= a^2 – ab – ba + b^2$
$= a^2 – 2ab + b^2$

38. $a^2 – b^2$ = (a + b) ___________.
Solution:-

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

39. $(a - b)^2$ + ____________ = $a^2 - b^2$

Solution:-

$(a - b)^2 + \underline{(2ab - 2b^2)} = a^2 - b^2$

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

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

$= a^2 - b^2$

40. $(a + b)^2 - 2ab$ = ___________ + ____________

Solution:-

$(a + b)^2 - 2ab = \underline{a^2 + b^2}$

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

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

$= a^2 + b^2$

41. $(x + a)(x + b) = x^2 + (a + b)x$ + ________.

Solution:-

$(x + a)(x + b) = x^2 + (a + b)x + \underline{ab}$

$= (x + a)(x + b)$

$= x \times (x + b) + a \times (x + b)$

$= x^2 + xb + xa + ab$

$= x^2 + x(b + a) + ab$

42. The product of two polynomials is a ________.

Solution:-

The product of two polynomials is a <u>polynomials</u>.

43. Common factor of $ax^2 + bx$ is __________.

Solution:-

Common factor of $ax^2 + bx$ is $\underline{x(ax + b)}$

44. Factorised form of 18mn + 10mnp is ________.

Solution:-

Factorised form of 18mn + 10mnp is $\underline{2mn(9 + 5p)}$

$= (2 \times 9 \times m \times n) + (2 \times 5 \times m \times n \times p)$

$= 2mn(9 + 5p)$