KINETICS
We Nurture The Future
IIT-JEE | Medical | Foundations

Algebraic Expressions

Question 1.
Find the value of $a^2 + b^2$ if a = 2 and b = -2.
(a) 0
(b) 8
(c) 4
(d) None of these

Answer: (b) 8
$2^2 + (-2)^2 = 4 + 4 = 8$.

Question 2.
Write an expression : Raju s father s age is 5 years more than 3 times Raju s age. If Raju s age is x years, then father's age is
(a) 3x – 5
(b) 3x + 7
(c) 5 – 3x
(d) 3x + 5

Answer: (d) 3x + 5

Question 3.
Subtract $-5y^2$ from y^2.
(a) $-4y^2$
(b) $4y^2$
(c) $6y^2$
(d) None of these

Answer: (c) $6y^2$
$y^2 - (-5y^2) = y^2 + 5y^2 = 6y^2$.

Question 4.
A _____ can take various values.
(a) variable
(b) expression
(c) term
(d) None of these

Answer: (a) variable

Question 5.
The simplified form of the Boolean expression (X + Y + XY)(X + Z) is
(a) X + Y + Z
(b) XY + YZ
(c) X + YZ
(d) XZ + Y

Answer: (c) X + YZ

Question 6.
Identify terms which contain x in following expression 13 y^2 – 8 yx
(a) -8yx
(b) 13 y^2
(c) -8y
(d) None of these

Answer: (a) -8 yx
Here, x is in the term -8yx.

Question 7.
For what value of 'm' is 9 − 5m = (−1)?
(a) −1
(b) −2
(c) 2
(d) 1

Answer: (c) 2

Question 8.
The number z is multiplied by itself, write its algebraic expresson.
(a) 2z
(b) z^2
(c) 2z
(d) None of these

Answer: (b) z^2
Product of z with z is z^2.

Question 9.
What is the difference between 3a + 2b and −2a − 5b?
(a) 5a + 7b
(b) – 5a – 7b
(c) 5a – 7b
(d) a – 3b

Answer: (a) 5a + 7b

Question 10.
Add 3 mn, -5 mn, 8 mn, -4mn.
(a) 2 mn
(b) 20 mn
(c) -2 mn
(d) None of these

Answer: (a) 2 mn
3 mn and 8 mn are positive so sum of -5 mn and -4mn is subtracted from sum of 3 mn and 8 mn.

Question 11.
Identify, in the following expressions, terms which are not constants : xy + 4.
(a) xy
(b) 4
(c) x
(d) y

Answer: (a) xy
Values of xy are variable. Therefore these are not constant.

Question 12.
An expression which contains two unlike terms is called _____.
(a) binomial
(b) monomial
(c) trinomial
(d) None of these

Answer: (a) binomial

Question 13.
Get the algebraic expression of subtraction of z from y.
(a) z – y
(b) y – z
(c) – z + y
(d) None of these

Answer: (b) y – z
z is subtracted from y.

Question 14.
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

Answer: (b) A+B is a zero polynomial.

Question 15.
Find the value of 7a – 4b if a = 3, b = 2.
(a) 17
(b) 29
(c) 13
(d) None of these

Answer: (c) 13
7×3 – 4×2 = 21 – 8 = 13.

Question 16.
Get the algebraic expressions for subtraction of z from y.
(a) y × z
(b) y – z
(c) y + z
(d) $\frac{y}{z}$

Answer: (b) y – z

Question 17.
What is the co-efficient ofy in the given algebraic expression 8 + yz.
(a) 8
(b) 1
(c) z
(d) None of these

Answer: (c) z
As term with factory is yz. Therefore, co-efficient of 2 is co-efficient of y.

Question 18.
What are the coefficients of y in the expression 4x – 3y?
(a) -4
(b) -3
(c) 3
(d) 4

Answer: (b) -3

Question 19.
Write the term which contains y^2 in expression $5y^2 + 7x$.
(a) 5
(b) $5y^2$
(c) 7
(d) None of these

Answer: (b) $5y^2$
y^2 is with constant 5.

Question 20.
Simplify these expressions and find their values, if x = 3, a = – 1, b = – 2.
3x – 5a – x2 + 9b
(a) -13
(b) 15
(c) 13
(d) None of these

Answer: (a) -13

Question 21.
Identify the co-efficient of x in the given expression : 4x – 3y.
(a) 4
(b) -3
(c) 4x
(d) None of these

Answer: (a) 4
As term with factor x is 4x therefore, co-efficient of x is 4.

Question 22.
The sum of mn + 5 – 2 and mn+3 is
(a) 2mn + 6
(b) mn + 6
(c) 2mn – 6
(d) mn – 6

Answer: (a) 2mn + 6

Question 23.
Find the value of x + 4 at x = 2.
(a) 2
(b) 6
(c) 4
(d) None of these

Answer: (b) 6
As x = 2 ∴ Given expression becomes 2 + 4 = 6.

Question 24.
What are the coefficients of y in the expression yz^2+ 5?
(a) z
(b) z^2
(c) 1
(d) 5

Answer: (b) z^2

Question 25.
Write the numerical co-efficients of 100 m + 1000 n.
(a) 100, 1000
(b) 100
(c) 1000
(d) None of these

Answer: (a) 100, 1000
Both terms have variable so numerical co-efficients are 100,1000.

Question 26.
Simplify combining like terms: 3a – 2b – ab – (a – b + ab) + 3ab + b – a
(a) a – ab
(b) a + ab
(c) a + b
(d) None of these

Answer: (b) a + ab

Question 27.
Numbers x and y when both squared and added, write it in algebraic expression.
(a) 2x + 2y
(b) x + y
(c) $x^2 + y^2$
(d) None of these

Answer: (c) $x^2 + y^2$
Square of x and square of y are x^2 and y^2. Sum is $x^2 + y^2$.

Question 28.
The length and breadth of a rectangular plot are I 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)

Answer: (c) (l + b − w)w

Question 29.
In the above identify numerical co-efficient of variables.
(a) 4
(b) y
(c) 1
(d) None of these

Answer: (c) 1
If there is not any co-efficient with variables then 1 is always numerical co-efficient of variables.

Question 30.
Find the value of x + 4 for x = 2.
(a) 6
(b) 8
(c) 4
(d) None of these

Answer: (a) 6

Question 31.
Identify terms in the expression x – 3.
(a) x, -3
(b) x, 3
(c) 1, -3
(d) None of these

Answer: (a) x, -3
x, -3 are terms of given expression.

Question 32.
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

Answer: (b) 2x+3

Question 33.
Write algebraic expression of one half of the sum of numbers x and y.
(a) $\frac{1}{2}$ (x + y)
(b) $\frac{x}{2} + y$
(c) $x + \frac{y}{2}$
(d) None of these

Answer: (a) $\frac{1}{2}$ (x + y)
Sum of x and y is divided by 2.

Question 34.
The constant term in the expression $1 + x^2 + x$ is
(a) 1
(b) x
(c) x^2
(d) None of these

Answer: (a) 1

Question 35.
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) $\frac{30}{7}$

Answer: (d) $\frac{30}{7}$

State whether the given statements are True or False.

Question 1.
A variable can take various values.

Answer: True

Question 2.
An expression with only one term is called a monomial.

Answer: True

Question 3.
A constant does not have a fixed value.

Answer: False

Question 4.
Terms 2xy and 4 are like terms.

Answer: False

Complete the following table :

S.No.	Expression	Terms with factor x	Co-efficient of x
(i)	$4x - 3y$	$4x$	_____
(ii)	$8 - x + y$	$-x$	_____
(iii)	$y^2 x - y$	y^2x	_____
(iv)	$2z - 5xz$	$-5xz$	_____

Answer:
(i) 4

(ii) -1
(iii) y^2
(iv) -5z

Match the following :

1. 7x, 12y	(a) Like terms
2. 15x, -21x	(b) Unlike terms
3. -4ab, 7ba	(c) Unlike terms
4. $6y^2$, $9x^2y$	(d) Like terms

Answer:

1. 7x, 12y	(c) Unlike terms
2. 15x, -21x	(a) Like terms
3. -4ab, 7ba	(d) Like terms
4. $6y^2$, $9x^2y$	(b) Unlike terms

Match the following :

1. 4y – 7z	(a) Monomial
2. y^2	(b) Monomial
3. x + y – xy	(c) Binomial
4. 100	(d) Trinomial

Answer:

1. 4y – 7z	(c) Binomial
2. y^2	(a) Monomial
3. x + y – xy	(d) Trinomial
4. 100	(b) Monomial

Complete the following table :

S.No.	Expression	Term which is not a constant
(i)	$xy + 4$	_____
(ii)	$13 - y^2$	_____
(iii)	$13 - y + 5y^2$	_____
(iv)	$4p^2q - 3pq^2 + 5$	_____

Answer:
(i) xy
(ii) $-y^2$
(iii) $-y, 5y^2$
(iv) $4p^2q, -3pq^2$

Identify like terms in the following :

$-xy^2, -4yx^2, 8x^2, 2xy^2, 7y, -11x^2,$
$-100x, -11yx, 20x^2y, -6x^2, y, 2xy, 3x.$

Answer:
$(-xy^2, 2xy^2)$; $(-4yx^2, 20x^2y)$
$(8x^2, -11x^2, -6x^2)$, $(7y, y)$
$(-100x, 3x)$ $(-11xy, 2xy)$

State whether a given pair of terms is of like or unlike terms.

Question 1.
1, 100

Answer: like

Question 2.
$-7x, \frac{5}{2}x$

Answer: like

Question 3.
$-29x, -29y$

Answer: unlike

Question 4.
14xy, 42yx

Answer: like

Question 5.
$4m^2p$, $4mp^2$

Answer: unlike

Question 6.
$12x^2$, $12x^2y^2$

Answer: unlike

Classify into monomials, binomials and trinomials.

Question 1.
$4y - 7z$

Answer: Binomial

Question 2.
y^2

Answer: Monomial

Question 3.
$x + y - xy$

Answer: Trinomial

Question 4.
$ab - a - b$

Answer: Trinomial

Question 5.
$z^2 - 3z + 8$

Answer: Trinomial

Question 6.
$z^2 + z$

Answer: Binomial

Use the given algebraic expression to complete the table of number patterns.

S.No.	Expression	1st	2nd	3rd	4th
(i)	$2n - 1$				
(ii)	$3n + 2$				
(iii)	$4n + 1$				
(iv)	$7n + 20$				

Answer:
(i) 1, 3, 5, 7
(ii) 2, 5, 8, 11
(iii) 5, 9, 13, 17
(iv) 27, 34, 41, 48

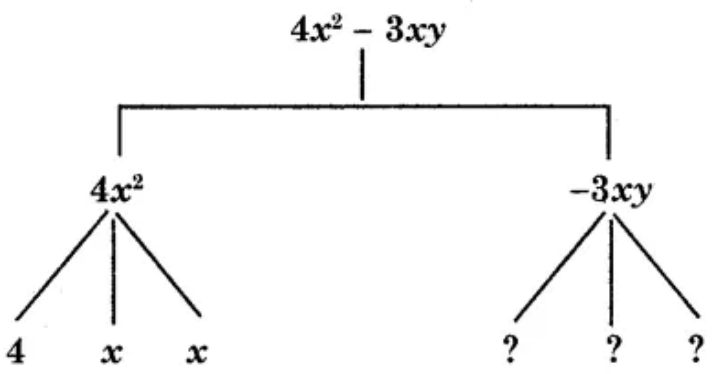
Match the following for a = 3, b = 2 :

1. a + b	(a) 13
2. 7a – 4b	(b) 1
3. $a^2 + 2ab + b^2$	(c) 5
4. $a^2 - b^3$	(d) 25

Answer:

1. a + b	(c) 5
2. 7a – 4b	(a) 13
3. $a^2 + 2ab + b^2$	(d) 25
4. $a^2 - b^3$	(b) 1

Complete the tree diagram.



Answer:
-3, x, y.

Fill in the blanks.

1. The terms having the same literal factors are called ……. terms.

Answer: like

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2. An expression with only one term is called a ……. .

Answer: monomial

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3. A statement of equality involving one or more variables is called an …… .

Answer: equation

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4. A symbol having a fixed numerical value is called a ……. .

Answer: constant

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5. A symbol which takes various numerical values is called a ……. .

Answer: variable

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6. An expression which contains two terms is called a …… .

Answer: binomial

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7. An expression with one or more terms is called a ……. .

Answer: polynomial

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8. A combination of constants and variables connected by the signs of basic operations of +, -, × and ÷ is called an …….. expression.

Answer: algebraic

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9. The terms not having the same literal factors are called ……. terms.

Answer: unlike

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10. An expression which contains three terms is called a ……. .

Answer: trinomial
