Chapter 11

Algebra

IMPORTANT DEFINITIONS

1. Algebra

Algebra is about finding the unknown or it is about connecting real life problems into equations and then solving them. Unfortunately many textbooks go straight to the rules, procedures and formulas, forgetting that these are real life problems being solved.

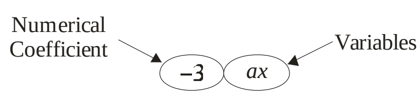
2. Algebraic Expression

An **algebraic Expressions** is an expression formed from any combination of numbers and variables by using the operations of addition, subtraction, multiplication, division, exponentiation (raising to powers), or extraction of roots.

For instance, $7,\ x,\ 2x = 3y + 1,\ \frac{5x^3 - 1}{4xy + 1},\ \pi r^2$ *and* $\pi r\sqrt{r^2 - h^2}$ are algebraic expressions. By an algebraic expression in certain variables, (1) we mean an expression that contains only those variables, and by a **constant**. (2) If numbers are substituted for the variables in an algebraic expression, the resulting number is called the **value** of the expression for these values of the variables.

3. Algebraic Terms

The basic unit of an algebraic expression is a term. In general, a *term* is either a number or a product of a number and one or more variables. Below is the term $-3ax$.



Difference types of term are (i) Constant term, (ii) Like term, (iii) Unlike term.

(i) **Constant term:** A term of the expression having no literal factor is called constant term.

(a) In the expression $3x + 5$, the constant term is 5.

(b) In the expression $x^2 + y^3 - \frac{4}{5}$, the constant term is $-\frac{4}{5}$.

(ii) **Like term:** The term having same terms literal factors are called like or similar term.

(iii) **Unlike term:** The terms not having the same literal factors are called unlike or dissimilar terms.

Example: In the expression $6x^2y + 5xy^2 - 8xy - 7yx^2$ we have $6x^2y$ and $-7yx^2$ as like terms, whereas $5xy^2$ and $-8xy^2$ are unlike terms.

4. How to Form Algebraic Expressions?

Example 1: Sarita has some marbles. Ameena has 10 more. Appu says that he has 3 more marbles than the number of marbles Sarita and Ameena together have. How do you get the number of marbles that Appu has?

Solution: Since it is not given how many marbles Sarita has, we shall take it to be x. Ameena then has 10 more, i.e., x + 10. Appu says that he has 3 more marbles than what Sarita and Ameena have together. So we take the sum of the numbers of Sarita's marbles and Ameena's marbles, and to this sum add 3, that is, we take the sum of x, x + 10 and 3.

Example 2: Ramu's father's present age is 3 times Ramu's age. Ramu's grandfather's age is 13 years more than the sum of Ramu's age and Ramu's father's age. How do you find Ramu's grandfather's age?

Solution: Since Ramu's age is not given, let us take it to be y years. Then his father's age is 3y years. To find Ramu's grandfather's age we have to take the sum of Ramu's age (y) and his father's age (3y) and to the sum add 13, that is, we have to take the sum of y, 3y and 13.

Example 3: In a garden, roses and marigolds are planted in square plots. The length of the square plot in which marigolds are planted is 3 meters greater than the length of the square plot in which roses are planted. How much bigger in area is the marigold plot than the rose plot?

Solution: Let us take l meters to be length of the side of the rose plot. The length of the side of the marigold plot will be (l + 3) meters. Their respective areas will be l^2 and $(l + 3)^2$. The difference between $(l + 3)^2$ and l^2 will decide how much bigger in area the marigold plot is. In all the three situations, we had to carry out addition or subtraction of algebraic expressions. There are a number of real life problems in which we need to use expressions and do arithmetic operations on them. In this section, we shall see how algebraic expressions are added and subtracted.

5. Various types of algebraic expression are as follows:

(i) **Monomial:** An expression which contains only one term is known as monomial. Thus, $3x$, $5xy^2$, -8 etc. are all monomial.

(ii) **Binomials:** An expression containing two terms is called a binomial. Thus $6 - y$, $2x + 3y$, $x^2 - 5xy^2z$ are all binomials.

(iii) **Trinomials:** An expression containing three terms is are called a trinomial. Thus, $2 + x - y$, $a + b + c$, $x^3 - y^3 + z^3$, $6 + xyz + x^2$ are all trinomials.

(iv) **Quadrinomials:** An expression containing four terms is called a quadrinomials. Thus, $x^2 + y^2 + z^2 - xy^2$, $x^3 + y^3 + 2^3 + 3xy^2$ etc., are quadrinomial.

(v) **Polynomial:** An expression containing two or more term is known as a polynomial.

6. Addition and Subtraction of Like Terms

The simplest expressions are monomials. They consist of only one term. To begin with we shall learn how to add or subtract like terms.

Example 4: Add 3x and 4x.

Solution: To add 3x and 4x, keep the variable part as it is. Just add the co-efficients of each like term. i.e., $3x + 4x = (3 \times x) + (4 \times x)$

$= (3 + 4) \times x$ (using distributive law) $= 7 \times x = 7x$ or $3x + 4x = 7x$

Example 5: Add 8xy, 4xy and 2xy

Solution: $8xy + 4xy + 2xy = (8 + 4 + 2) \times xy = 14 \times xy = 14xy$ or $8xy + 4xy + 2xy = 14xy$

Example 6 : Subtract 4n from 7n.

Solution: $7n - 4n = (7 \times n) - (4 \times n) = (7 - 4) \times n = 3 \times n = 3n$ or $7n - 4n = 3n$

Example 7: Subtract 5ab from 11ab.

Solution: $11ab - 5ab = (11 - 5)\ ab = 6ab$

Thus, the sum of two or more like terms is a like term with a numerical coefficient equal to the sum of the numerical coefficients of all the like terms. Similarly, the difference between two like terms is a like term with a numerical coefficient equal to the difference between the numerical coefficients of the two like terms.

Note: Unlike terms cannot be added or subtracted the way like terms are added or subtracted. We have already seen examples of this, when 5 is added to x, we write the result as $(x + 5)$. Observe that in $(x + 5)$ both the terms 5 and x are retained. Similarly, if we add the unlike terms 3xy and 7, the sum is $3xy + 7$. If we subtract 7 from 3xy, the result is $3xy - 7$.

7. Adding and Subtracting General Algebraic Expressions

Rule of Addition: The sum of several like terms is another like term whose coefficient in the sum of the coefficient of the like terms.

Let us take some examples:

Example 8: Add $3x + 11$ and $7x - 5$

Solution: $(3x + 11) + (7x - 5) = 3x + 11 + 7x - 5$

$= 3x + 7x + 11 - 5$ (rearranging terms)

$= (3x + 7x) + (11 - 5)$ (grouping like terms) $= 10x + 6$

Hence, $3x + 11 + 7x - 5 = 10x + 6$

Example 9: Add $3x + 11 + 8z$ and $7x - 5$.

Solution: $(3x + 11 + 8z) + (7x - 5) = 3x + 11 + 8z + 7x - 5$

$= (3x + 7x) + (11 - 5) + 8z$ (grouping like terms) $= 10x + 6 + 8z$

Therefore, the sum $= 10x + 6 + 8z$

Example 10: Subtract $a - b$ from $3a - b + 4$

Solution: $(3a - b + 4) - (a - b) = 3a - b + 4 - a + b$

$= (3a - a) + (b - b) + 4$ (grouping like terms)

$= (3 - 1)\,a + (1 - 1)\,b + 4$ (using Distributive law) $= 2a + (0)\,b + 4 = 2a + 4$

(or) $3a - b + 4 - (a - b) = 2a + 4$

Example 11: Collect like terms and simplify the expression:

$12m^2 - 9m + 5m - 4m^2 - 7m + 10$

Solution: Rearranging terms, we have

$12m^2 - 4m^2 + 5m - 9m - 7m + 10 = (12 - 4)\,m^2 + (5 - 9 - 7)\,m + 10$

$12m^2 - 4m^2 + 5m - 9m - 7m + 10 = 8m^2 + (-4 - 7)\,m + 10$

$= 8m^2 + (-11)\,m + 10 \quad = 8m^2 - 11m + 10$

Column Method: In this method, each expression is written in separate such that their like terms are arranged one below the, other in a column. Then, addition or subtraction of the terms is done column wise.

Example 12: Subtract $24ab - 10b - 18a$ from $30ab + 12b + 14a$.

Solution: $30ab + 12b + 14a - (24ab - 10b - 18a) = 30ab + 12b + 14a - 24ab + 10b + 18a$

$= 30ab - 24ab + 12b + 10b + 14a + 18a$

$= 6ab + 22b + 32a$

Alternatively, we write the expressions one below the other with the like terms appearing exactly below like terms as:

$30ab$	$+$	$12b$	$+$	$14a$
$24ab$	$-$	$10b$	$-$	$18a$
$(-)$		$(+)$		$(+)$
$6ab$	$+$	$22b$	$+$	$32a$

Example 13: From the sum of $2y^2 + 3yz$, $-y^2 - yz - z^2$ and $yz + 2z^2$, subtract the sum of $3y^2 - z^2$ and $-yv + yz + z^2$.

Solution: We first add $2y^2 + 3yz$, $-y^2 - yz - z^2$ and $yz + 2z^2$.

$2y^2 + 3yz$

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

$(+)\ + yz + 2z^2$

$y^2 + 3yz + z^2 \qquad (1)$

We then add $3y^2 - z^2$ and $-y^2 + yz + z^2$

$$
\begin{array}{ll}
 & 3y^2 - z^2 \\
(+) & -y^2 + yz + z^2 \\
\hline
 & 2y^2 + yz \qquad (2) \\
\hline
\end{array}
$$

Now we subtract sum (2) from the sum (1):

$$
\begin{array}{l}
y^2 + 3yz + z^2 \\
2y^2 + \quad yz \\
(-) \quad (-) \\
\hline
-y^2 + 2yz + z^2
\end{array}
$$

8. Finding the Value of an Algebraic Expression

We know that the value of an algebraic expression depends on the values of the variables forming the expression. There are a number of situations in which we need to find the value of an expression, such as when we wish to check whether a particular value of a variable satisfies a given equation or not. We find values of expressions, also, when we use formulas from geometry and from everyday mathematics. For example, the area of a square is l^2, where l is the length of a side of the square. If l = 5 cm., the area is 52 cm^2 or 25 cm^2; if the side is 10 cm, the area is 10^2cm^{2}or 100 cm^2 and so on. We shall see more such examples in the next section.

Example 14: Find the values of the following expressions for $x = 2$.

(i) $x + 4$ (ii) $4x - 3$ (iii) $19 - 5x^2$ (iv) $100 - 10x^3$

Solution: Putting $x = 2$

i) In $x + 4$, we get the value of $x + 4$, i.e., $x + 4 = 2 + 4 = 6$

ii) In $4x - 3$, we get $4x - 3 = (4 \times 2) - 3 = 8 - 3 = 5$

iii) In $19 - 5x^2$, we get

$19 - 5x^2 = 19 - (5 \times 22) = 19 - (5 \times 4) = 19 - 20 = -1$

iv) In $100 - 10x^3$, we get

$100 - 10x^3 = 100 - (10 \times 23) = 100 - (10 \times 8)$ (Note 23 = 8)

$= 100 - 80 = 20$

Example 15: Find the value of the following expressions when $n = -2$.

(i) $5n - 2$ (ii) $5n^2 + 5n - 2$ (iii) $n^3 + 5n^2 + 5n - 2$

Solution:

i) Putting the value of $n = -2$, in $5n - 2$, we get, $5(-2) - 2 = -10 - 2 = -12$

ii) In $5n^2 + 5n - 2$, we have, for $n = -2$, $5n - 2 = -12$

and $5n^2 = 5 \times (-2)2 = 5 \times 4 = 20$ [as $(-2)2 = 4$]

Combining, $5n^2 + 5n - 2 = 20 - 12 = 8$

iii) Now, for $n = -2$, $5n^2 + 5n - 2 = 8$ and

$n^3 = (-2)^3 = (-2) \times (-2) \times (-2) = -8$

Combining, $n^3 + 5n^2 + 5n - 2 = -8 + 8 = 0$

We shall now consider expressions of two variables, for example, $x + y$, xy. To work out the numerical value of an expression of two variables, we need to give the values of both variables. For example, the value of $(x + y)$, for $x = 3$ and $y = 5$, is $3 + 5 = 8$.

Example 16: Find the value of the following expressions for $a = 3$, $b = 2$.

(i) $a + b$ (ii) $7a – 4b$ (iii) $a^2 + 2ab + b^2$ (iv) $a^3 – b^3$

Solution: Substituting $a = 3$ and $b = 2$ in

i) $a + b$, we get $a + b = 3 + 2 = 5$

ii) $7a – 4b$, we get $7a – 4b = 7 \times 3 – 4 \times 2 = 21 – 8 = 13$.

iii) $a^2 + 2ab + b^2$, we get

$a^2 + 2ab + b^2 = 32 + 2 \times 3 \times 2 + 22 = 9 + 2 \times 6 + 4 = 9 + 12 + 4 = 25$

iv) $a^3 – b^3$, we get

$a^3 – b^3 = 33 – 23 = 3 \times 3 \times 3 – 2 \times 2 \times 2 = 9 \times 3 – 4 \times 2 = 27 – 8 = 19$

TIPS FOR COMPETITIVE LEVEL

9. Simple Equation

Equation: A statement of equality which involves one or more variable is called equation.

Note: An equation has an **equal sign** (=) between its two sides. The equation says that the value of the left hand side (LHS) is equal to the value of the right hand side (RHS). If the LHS is not equal to the RHS, we do not get an equation. For example , The statement $2n$ is greater than 10, i.e. $2n > 10$ is not an equation. Similarly, the statement $2n$ is smaller than 10 i.e. $2n < 10$ is not an equation.

Solution of an Equation: The value of the variable in an equation which satisfies the equation is called a solution to the equation. Thus, $n = 5$ is a solution to the equation $2n = 10$.

10. Method for Solving an Equation

In this section we shall look at some simple equations and the methods used to find their solution. There are four basic rules:

Rule 1: An equal quantity may be added to both sides of an equation.
Rule 2: An equal quantity may be subtracted form both sides of an equation.
Rule 3: An equal quantity may multiply both sides of an equation.
Rule 4: An equal *non-zero* quantity may divide both sides of an equation.

The application of these rules is illustrated in the following examples:

Example 17: Solve the equations

a) $3x – 8 = x + 10$ b) $\frac{x}{2} = -6$

Solution: a) By Rule 1 we may add 8 to both sides:

$3x - 8 + 8 = x + 10 + 8$ i.e. $3x = x + 18$

By Rule 2 we may subtract x from both sides.

$3x - x = x + 18 - x$ i.e. $2x = 18$

Finally, by Rule 4 we may divide both sides by 2 giving $x = 9$

b) By Rule 3 we may multiply both sides by 2,

$\left(\frac{2}{1}\right) \times \left(\frac{x}{2}\right) = 2 \times (-6)$ i.e. $x = -12$

Exercise 18: Solve each of the following equations

a) $3x = 18$ b) $7x = -14$ c) $-2x = 10$

d) $28x = 35$ e) $5x - 3x - 12x = 29 - 2 - 7$ f) $-\frac{x}{5} = 3$

Example 19: Find the solution to the equation

$5(x - 3) - 7(6 - x) = 24 - 3(8 - x) - 3$

Solution: Removing the brackets from both sides first and then simplifying:

$$5(x - 3) - 7(6 - x) = 24 - 3(8 - x) - 3$$
$$5x - 15 - 42 + 7x = 24 - 24 + 3x - 3$$
$$5x + 7x - 15 - 42 = 3x - 3$$
$$12x - 57 = 3x - 3$$

Adding 57 to both sides:

$12x = 3x - 3 + 57 = 3x + 54$

Substracting $3x$ from both sides:

$12x - 3x - 3 + 57$ giving $x = 6$

Example 20: Find the solution to each to the following equations.

a) $2x + 3 = 16 - (2x - 3)$

b) $8(x - 1) + 17(x - 3) = 4(4x - 9) + 4$

c) $15(x - 1) + 4(x + 3) = 2(7 + x)$

When fractions occur we can sometimes transform the equation to one that does not involve fractions.

Example 21: Find the solution to the equation

$(4x/5) - (7/4) = (x/5) + (x/4)$

Solution: The least common multiple of the denominators in the equation is $4 \times 5 = 20$ and we proceed as follows:

$$20\left(\frac{4x}{5} - \frac{7}{4}\right) = 20\left(\frac{x}{5} - \frac{x}{4}\right)$$
$$\frac{20}{1} \cdot \frac{4x}{5} - \frac{20}{1} \cdot \frac{7}{4} = \frac{20}{1} \cdot \frac{x}{5} - \frac{20}{1} \cdot \frac{x}{4}$$
$$16x - 35 = 4x + 5x$$
$$16x - 35 = 9x$$

Adding 35 to both sides and subtracting 9x from both sides leads to $7x = 35$ so $x = 5$ the solution to the equation.

PART – I: MISCELLANEOUS DOMAIN

1. Simplify combining like terms:

   i) $21b - 32 + 7b - 20b$

   ii) $- z^2 + 13z^2 - 5z + 7z^3 - 15z$

   iii) $p - (p - q) - q - (q - p)$

   iv) $3a - 2b - ab - (a - b + ab) + 3ab + b - a$

   v) $5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2$

   vi) $(3y^2 + 5y - 4) - (8y - y^2 - 4)$

2. Add:

   i) $3mn, - 5mn, 8mn, - 4mn$

   ii) $t - 8tz, 3tz - z, z - t$

   iii) $- 7mn + 5, 12mn + 2, 9mn - 8, - 2mn - 3$

   iv) $a + b - 3, b - a + 3, a - b + 3$

   v) $14x + 10y - 12xy - 13, 18 - 7x - 10y + 8xy, 4xy$

   vi) $5m - 7n, 3n - 4m + 2, 2m - 3mn - 5$

   vii) $4x^2y, - 3xy^2, -5xy^2, 5x^2y$

   viii) $3p^2q^2 - 4pq + 5, - 10 p^2q^2, 15 + 9pq + 7p^2q^2$

   ix) $ab - 4a, 4b - ab, 4a - 4b$

   x) $x^2 - y^2 - 1, y^2 - 1 - x^2, 1 - x^2 - y^2$

3. **Subtract:**

   i) $-5y^2$ from y^2

   ii) $6xy$ from $-12xy$

   iii) $(a - b)$ from $(a + b)$

   iv) $a (b - 5)$ from $b (5 - a)$

   v) $-m^2 + 5mn$ from $4m^2 - 3mn + 8$

   vi) $- x^2 + 10x - 5$ from $5x - 10$

   vii) $5a^2 - 7ab + 5b^2$ from $3ab - 2a^2 - 2b^2$

   viii) $4pq - 5q^2 - 3p^2$ from $5p^2 + 3q^2 - pq$

4. a) What should be added to $x^2 + xy + y^2$ to obtain $2x^2 + 3xy$?

   b) What should be subtracted from $2a + 8b + 10$ to get $- 3a + 7b + 16$?

5. What should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain $-x^2 - y^2 + 6xy + 20$?

6. a) From the sum of $3x - y + 11$ and $-y - 11$, subtract $3x - y - 11$.

   b) From the sum of $4 + 3x$ and $5 - 4x + 2x^2$, subtract the sum of $3x^2 - 5x$ and $-x^2 + 2x + 5$.

7. If $m = 2$, find the value of: (i) $m - 2$ (ii) $3m - 5$ (iii) $9 - 5m$ (iv) $3m^2 - 2m - 7$ (v) 5

8. If $p = -2$, find the value of: (i) $4p + 7$ (ii) $-3p^2 + 4p + 7$ (iii) $-2p^3 - 3p^2 + 4p + 7$

9. Find the value of the following expressions, when $x = -1$:

   (i) $2x - 7$ (ii) $-x + 2$ (iii) $x^2 + 2x + 1$(iv) $2x^2 - x - 2$

10. If $a = 2$, $b = -2$, find the value of: (i) $a^2 + b^2$ (ii) $a^2 + ab + b^2$ (iii) $a^2 - b^2$

11. When $a = 0$, $b = -1$, find the value of the given expressions:

    (i) $2a + 2b$ (ii) $2a^2 + b^2 + 1$ (iii) $2a^2b + 2ab^2 + ab$ (iv) $a^2 + ab + 2$

12. Simplify the expressions and find the value if x is equal to 2

    (i) $x + 7 + 4(x - 5)$ (ii) $3(x + 2) + 5x - 7$; (iii) $6x + 5(x - 2)$ (iv) $4(2x - 1) + 3x + 11$

13. Simplify these expressions and find their values if $x = 3$, $a = -1$, $b = -2$.

    (i) $3x - 5 - x + 9$ (ii) $2 - 8x + 4x + 4$ (iii) $3a + 5 - 8a + 1$ (iv) $10 - 3b - 4 - 5b$

    (v) $2a - 2b - 4 - 5 + a$

14. (i) If $z = 10$, find the value of $z^3 - 3(z - 10)$; (ii) If $p = -10$, find the value of $p^2 - 2p - 100$

15. What should be the value of a if the value of $2x^2 + x - a$ equals to 5, when $x = 0$?

16. Simplify the expression and find its value when $a = 5$ and $b = -3$. $2(a^2 + ab) + 3 - ab$

HIGHER ORDER THINKING SKILLS (HOTS)

17. Rakhi travelled $4x$ km distance by walk, $2y$ km by cycle and 9 km by bus. The total distance covered by Rakhi in an algebraic expression is ________.

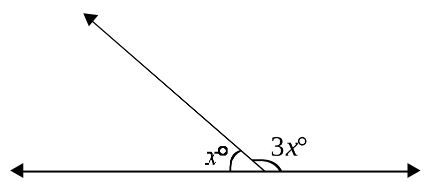
18. I had `200 with me. I gave `x to amount ` $\frac{x}{2}$ to Vidhu and I am left with ` $\frac{x}{2}$. The amount I gave to Vidhu is ______.

19. If six times of a number is 48, then the number is _______.

20. In 6a(2a – 1) + 8 = 14, then value of ‘a’ is _______.

21. Half the number is added to 18, then sum is 46, find the number?

22. In a given figure, magnitude of angle shown are



23. Find the value of x is $\frac{x}{4}+\frac{1}{2}=4$?

24. Meera bought packs of trading cards that contain 10 cards each. She gave away 7 cards.

x = No. of packs of trading cards.

Which expression shows the number of cards left with meera?

(a) 10x – 7 (b) 7x – 8 (c) 5 – 10x (d) 8 – 5x

25. Find the value of p if, $\frac{2}{3}p-2\frac{1}{2}=3\frac{1}{2}$,

26. Find the value of x for which the equation is 16(x + 7) = 144?

27. If 3x + 8 = 17, find the value of x?

28. The number of girls in a class is 5 times the number of boys. Which of the following can not be the total number of children in the class?

29. Simplify:

(i) $(x^2-y^2+2xy+1)-(x^2+y^2+4xy-5)$

(ii) $2a-(3b-\{a-(2c-3b)+4c-3(a-b-2c)\}]$

(iii) $5x-[4y-\{7x-(3z-2y)+4z-3(x+3y-22)\}]$

30. When Raju multiplies a certain number by 17 and adds 40 to the product, he gets 225 find that number?

31. From the sum of $6x^4 - 3x^3 + 7x^2 - 5x + 1$ and $-3x^4 + 5x^3 - 9x^2 + 7x - 2$ subtract $2x^4 - 5x^3 + 2x^2 - 6x - 8$

32. If $A = 7x^2 + 5xy - 9y^2$, $B = -4x^2 + xy + 5y^2$ and $C = 4y^2 - 3x^2 - 6xy$ then show that $A + B + C = Q$.

33. By how much is $2x - 3y + 4z$ greater than $2x + 5y - 6z + 2$?

34. Simplify: $2p^3 - 3p^2 + 4p - 5 - 6p^3 + 2p^2 - 8p - 2 + 6p + 8$.

35. Let $P = a^2 - b^2 - 2ab$, $Q = a^2 + 4b^2 - 6ab$, $R = b^2 + 6$, $S = a^2 - 4ab$ and $T = -2a^2 + b^2 - ab + a$

Find the value of $P + Q + R + S + T$?

36. Simplify: $5x - [4y - \{7x - (z - 2y) + 4z - 3(x + 3y - 2z)\}]$

37. Simplify: $(x^2 - y^2 + 2xy + 1) - (x^2 + y^2 + 4xy - 5)$

38. Solve: $\frac{x}{8} - \frac{1}{2} = \frac{x}{6} - 2$, check the result?

39. Mona's father is thrice as old as Mona. After 12 years, his age will be twice that of his daughter find their present age?

40. Five times the price of a pen is `17 more than three times its price. Find the price of the pen?

PART – II: MULTIPLE CHOICE QUESTIONS

1. Which of the following is the solution to the equation 8x + 5x – 3x = 17 – 89 + 22?

(a) 2 (b) –2 (c) 3 (d) –3

2. Which of the following is the solution to the equation $x - 13x = 3x - 6$?

(a) $\frac{2}{5}$ (b) $-\frac{1}{5}$ (c) $\frac{1}{3}$ (d) $-\frac{6}{17}$

3. Which of the following is the solution to the equation

$5x - (4x - 7)(3x - 5) = 6 - 3(4x - 9)(x - 1)$?

(a) –2 (b) –1 (c) 2 (d) 4

4. Solve: $\frac{4(x+2)}{5}=\frac{7+5x}{13}$

(a) 5 (b) 13 (c) –5 (d) –13

5. Solve: $\frac{(x+20)}{9}+\frac{3x}{7}=6$

(a) 9 (b) 7 (c) 5 (d) 2

6. Solve: $\frac{(x+35)}{6}-\frac{(x+7)}{9}=\frac{(x+21)}{4}$

(a) –5 (b) 2 (c) 4 (d) –1

7. $(x + 1)(2x + 1) = (x + 3)(2x + 3) - 14$

(a) 1 (b) –1 (c) 2 (d) –2

8. If $\frac{x}{5}=1$, then

(a) $x=\frac{1}{5}$ (b) $x = 5$ (c) $x = (5 + 1)$ (d) None of these

9. By how much does 1 exceeds 2x – 3y – 4?

(a) $2x - 3y + 5$ (b) $2x - 3y - 3$ (c) $5 - 2x + 3y$ (d) None of these

10. Find the value of $2x-[3y-\{2x-(y-x)\}]$

(a) $5x - 4y$ (b) $4y - 5x$ (c) $5y - 4x$ (d) $4x - 5y$

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