SECTION A: Multiple Choice Questions (1-23)

Choose the correct answer from the given options.

1. If each match box contains 50 matchsticks, the number of matchsticks required to fill n such boxes is:

(A) 50 + n
(B) 50n
(C) 50 ÷ n
(D) 50 – n

Solution: Answer: (B) 50n
Given: Each match box contains 50 matchsticks To find: Number of matchsticks required to fill n boxes Total matchsticks = Number of boxes × Matchsticks per box Total matchsticks = n × 50 = 50n

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2. Amulya is x years of age now. 5 years ago her age was:

(A) (5 – x) years
(B) (5 + x) years
(C) (x – 5) years
(D) (5 ÷ x) years

Solution: Answer: (C) (x – 5) years
Current age of Amulya = x years Age 5 years ago = Current age – 5 = x – 5 years

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3. Which of the following represents 6 × x:

(A) 6x
(B) x/6
(C) 6 + x
(D) 6 – x

Solution: Answer: (A) 6x
In algebra, multiplication is represented by writing variables together. Therefore, 6 × x = 6x

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4. Which of the following is an equation:

(A) x + 1
(B) x – 1
(C) x – 1 = 0
(D) x + 1 > 0

Solution: Answer: (C) x – 1 = 0
An equation is an expression with a variable, constants, and the equality sign (=). Only option (C) contains the equality sign, making it an equation.

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5. If x takes the value 2, then the value of x + 10 is:

(A) 20
(B) 12
(C) 5
(D) 8

Solution: Answer: (B) 12
Given: x = 2 Substituting in x + 10: x + 10 = 2 + 10 = 12

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6. If the perimeter of a regular hexagon is x metres, then the length of each of its sides is:

(A) (x + 6) metres
(B) (x ÷ 6) metres

(C) (x – 6) metres
(D) (6 ÷ x) metres
Solution: Answer: (B) (x ÷ 6) metres
A regular hexagon has 6 equal sides. Perimeter = 6 × length of each side Given: Perimeter = x metres Therefore: x = 6 × length of each side Length of each side = x ÷ 6 metres

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7. Which of the following equations has x = 2 as a solution:
(A) x + 2 = 5
(B) x – 2 = 0
(C) 2x + 1 = 0
(D) x + 3 = 6
Solution: Answer: (B) x – 2 = 0
Checking option (B): x – 2 = 0 Adding 2 to both sides: x = 2 Therefore, x = 2 is the solution.

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8. For any two integers x and y, which of the following suggests that operation of addition is commutative:
(A) x + y = y + x
(B) x + y > x
(C) x – y = y – x
(D) x × y = y × x
Solution: Answer: (A) x + y = y + x
The commutative property of addition states that changing the order of addends does not change the sum. This is represented as: a + b = b + a Therefore: x + y = y + x

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9. Which of the following equations does not have a solution in integers:
(A) x + 1 = 1
(B) x – 1 = 3
(C) 2x + 1 = 6
(D) 1 – x = 5
Solution: Answer: (C) 2x + 1 = 6
Solving: 2x + 1 = 6 2x = 6 – 1 = 5 x = 5/2 = 2.5
Since 2.5 is not an integer, this equation has no integer solution.

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10. In algebra, a × b means ab, but in arithmetic 3 × 5 is:
(A) 35
(B) 53
(C) 15
(D) 8
Solution: Answer: (C) 15
In arithmetic, 3 × 5 means 3 multiplied by 5, which equals 15.

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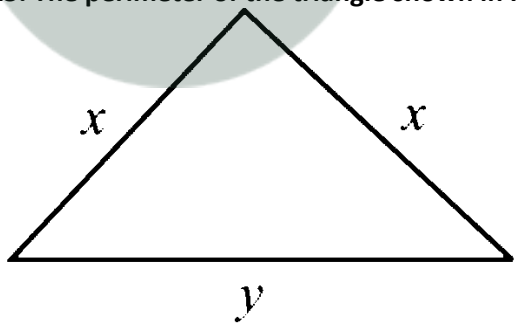
11. In algebra, letters may stand for:
(A) known quantities
(B) unknown quantities
(C) fixed numbers
(D) none of these
Solution: Answer: (B) unknown quantities
In algebra, letters (variables) represent unknown quantities whose values can change or are to be determined.

12. "Variable" means that it:
(A) can take different values
(B) has a fixed value
(C) can take only 2 values
(D) can take only three values
Solution: Answer: (A) can take different values
A variable is something that can vary or change. Its value is not fixed and can take different values depending on the context.

13. 10 – x means:
(A) 10 is subtracted x times
(B) x is subtracted 10 times
(C) x is subtracted from 10
(D) 10 is subtracted from x
Solution: Answer: (C) x is subtracted from 10
The expression 10 – x means that x is being subtracted from 10.

14. Savitri has a sum of Rs x. She spent Rs 1000 on grocery, Rs 500 on clothes and Rs 400 on education, and received Rs 200 as a gift. How much money (in Rs) is left with her:
(A) x – 1700
(B) x – 1900
(C) x + 200
(D) x – 2100
Solution: Answer: (A) x – 1700
Initial amount = Rs x Total expenses = 1000 + 500 + 400 = Rs 1900 Gift received = Rs 200 Money left = Initial amount – Total expenses + Gift Money left = x – 1900 + 200 = x – 1700

15. The perimeter of the triangle shown in Fig. 7.1 is:



(A) 2x + y
(B) x + 2y
(C) x + y
(D) 2x – y
Solution: Answer: (A) 2x + y
From the figure, the triangle is isosceles with two sides of length x and one side of length y.
Perimeter = x + x + y = 2x + y

16. The area of a square having each side x is:
(A) x × x
(B) 4x

(C) x + x
(D) 4 + x
Solution: Answer: (A) x × x
Area of a square = side × side Given: side = x Therefore, area = x × x = x^2

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17. The expression obtained when x is multiplied by 2 and then subtracted from 3 is:
(A) 2x – 3
(B) 2x + 3
(C) 3 – 2x
(D) 3x – 2
Solution: Answer: (C) 3 – 2x
Step 1: x is multiplied by 2 → 2x Step 2: This result is subtracted from 3 → 3 – 2x

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18. q/2 = 3 has a solution:
(A) 6
(B) 8
(C) 3
(D) 2
Solution: Answer: (A) 6
Given: q/2 = 3 Multiplying both sides by 2: q = 3 × 2 = 6

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19. x – 4 = –2 has a solution:
(A) 6
(B) 2
(C) –6
(D) –2
Solution: Answer: (B) 2
Given: x – 4 = –2 Adding 4 to both sides: x = –2 + 4 = 2

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20. 4/2 = 2 denotes a:
(A) numerical equation
(B) algebraic expression
(C) equation with a variable
(D) false statement
Solution: Answer: (A) numerical equation
4/2 = 2 is a numerical equation as it contains only numbers and the equality sign, with no variables.

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21. Kanta has p pencils in her box. She puts q more pencils in the box. The total number of pencils with her are:
(A) p + q
(B) pq
(C) p – q
(D) p ÷ q
Solution: Answer: (A) p + q
Initial pencils = p Additional pencils = q Total pencils = p + q

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22. The equation 4x = 16 is satisfied by the following value of x:
(A) 4
(B) 2

(C) 12
(D) –12
Solution: Answer: (A) 4
Given: 4x = 16 Dividing both sides by 4: x = 16/4 = 4

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23. I think of a number and on adding 13 to it, I get 27. The equation for this is:
(A) x – 27 = 13
(B) x – 13 = 27
(C) x + 27 = 13
(D) x + 13 = 27
Solution: Answer: (D) x + 13 = 27
Let the number be x. Adding 13 to it gives 27, so: x + 13 = 27

SECTION B: Fill in the Blanks (24-40)
24. The distance (in km) travelled in h hours at a constant speed of 40km per hour is _____.
Solution: 40h
Distance = Speed × Time = 40 × h = 40h km

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25. p kg of potatoes are bought for Rs 70. Cost of 1kg of potatoes (in Rs) is _____.
Solution: 70/p
Cost per kg = Total cost ÷ Total quantity = 70/p

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26. An auto rickshaw charges Rs 10 for the first kilometre then Rs 8 for each subsequent kilometre. The total charge (in Rs) for d kilometres is _____.
Solution: 2 + 8d
For d kilometres: First kilometre: Rs 10 Remaining (d-1) kilometres: Rs 8(d-1) = Rs 8d - 8 Total charge = 10 + 8d - 8 = 2 + 8d

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27. If 7x + 4 = 25, then the value of x is _____.
Solution: 3
7x + 4 = 25 7x = 25 - 4 = 21 x = 21/7 = 3

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28. The solution of the equation 3x + 7 = –20 is _____.
Solution: -9
3x + 7 = -20 3x = -20 - 7 = -27 x = -27/3 = -9

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29. 'x exceeds y by 7' can be expressed as _____.
Solution: x - y = 7
If x exceeds y by 7, then x is 7 more than y, so x - y = 7.

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30. '8 more than three times the number x' can be written as _____.
Solution: 3x + 8
Three times x = 3x 8 more than 3x = 3x + 8

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31. Number of pencils bought for Rs x at the rate of Rs 2 per pencil is _____.
Solution: x/2
Number of pencils = Total money ÷ Cost per pencil = x/2

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32. The number of days in w weeks is _____.

Solution: 7w
1 week = 7 days w weeks = 7w days

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33. Annual salary at r rupees per month along with a festival bonus of Rs 2000 is _____.
Solution: 12r + 2000
Annual salary = Monthly salary × 12 + Bonus = 12r + 2000

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34. The two digit number whose ten's digit is 't' and units's digit is 'u' is _____.
Solution: 10t + u
In place value system: ten's place value = 10t, unit's place value = u Two-digit number = 10t + u

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35. The variable used in the equation 2p + 8 = 18 is _____.
Solution: p
The variable is the letter that represents an unknown quantity, which is 'p' in this equation.

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36. x metres = _____ centimetres
Solution: 100x
1 metre = 100 centimetres x metres = 100x centimetres

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37. p litres = _____ millilitres
Solution: 1000p
1 litre = 1000 millilitres p litres = 1000p millilitres

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38. r rupees = _____ paise
Solution: 100r
1 rupee = 100 paise r rupees = 100r paise

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39. If the present age of Ramandeep is n years, then her age after 7 years will be _____.
Solution: n + 7 years
Age after 7 years = Present age + 7 = n + 7 years

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40. If I spend f rupees from 100 rupees, the money left with me is _____ rupees.
Solution: 100 - f
Money left = Initial amount - Amount spent = 100 - f rupees

SECTION C: True or False (41-48)
41. 0 is a solution of the equation x + 1 = 0
Solution: False
Solving x + 1 = 0: x = -1 Therefore, 0 is not a solution.

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42. The equations x + 1 = 0 and 2x + 2 = 0 have the same solution.
Solution: True
Equation 1: x + 1 = 0 → x = -1 Equation 2: 2x + 2 = 0 → 2x = -2 → x = -1 Both have the same solution: x = -1

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43. If m is a whole number, then 2m denotes a multiple of 2.
Solution: True
Any whole number multiplied by 2 gives a multiple of 2.

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44. The additive inverse of an integer x is 2x.
Solution: False
The additive inverse of x is -x, not 2x.

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45. If x is a negative integer, –x is a positive integer.
Solution: True
If x is negative, then -x becomes positive. Example: If x = -5, then -x = -(-5) = 5 (positive)

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46. 2x – 5 > 11 is an equation.
Solution: False
This is an inequality (contains > symbol), not an equation (which requires = symbol).

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47. In an equation, the LHS is equal to the RHS.
Solution: True
An equation states that the left-hand side (LHS) equals the right-hand side (RHS).

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48. In the equation 7k – 7 = 7, the variable is 7.
Solution: False
In the equation 7k - 7 = 7, the variable is 'k', not 7. Numbers are constants, not variables.

Key Concepts Summary
Variables and Constants

- **Variable**: A symbol (usually a letter) that represents an unknown quantity that can take different values
- **Constant**: A fixed numerical value that doesn't change

Algebraic Expressions

- Combinations of variables and constants using mathematical operations
- Examples: 3x + 5, 2a - 7, 5xy

Equations

- Mathematical statements showing that two expressions are equal
- Must contain an equality sign (=)
- Example: 3x + 4 = 19

Important Properties

- **Commutative Property of Addition**: a + b = b + a
- **Additive Inverse**: The additive inverse of x is -x

Unit Conversions

- 1 metre = 100 centimetres
- 1 litre = 1000 millilitres
- 1 rupee = 100 paise
- 1 week = 7 days