

Linear Equations in One Variable

Mathematics · Class 8 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Use of a calculator is **not** allowed.
- Rough work may be done on the blank space at the side of each page.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

- The solution of $3x + 5 = 20$ is $x =$ _____.
 (A) 3 (B) 5
 (C) 15 (D) 25
- Which of the following is a linear equation in one variable?
 (A) $x^2 + 3 = 7$ (B) $2x + 3y = 9$
 (C) $\frac{1}{x} + 2 = 5$ (D) $5x - 7 = 3$
- If $\frac{x}{4} = 7$, then $x =$ _____.
 (A) 28 (B) 11
 (C) $\frac{7}{4}$ (D) 3
- The solution of $2(x - 3) = 8$ is $x =$ _____.
 (A) 4 (B) 5
 (C) 7 (D) 11
- Solve $5x - 3 = 3x + 9$.
 (A) $x = 3$ (B) $x = 12$
 (C) $x = 6$ (D) $x = -6$
- The solution of $x + 7 = 3$ is $x =$ _____.
 (A) 10 (B) 4
 (C) -10 (D) -4
- If $\frac{2x + 1}{3} = 5$, then $x =$ _____.
 (A) 7 (B) 8
 (C) 2 (D) $\frac{14}{3}$

8. If $7x = 0$, then $x =$ _____.

(A) 7

(B) $\frac{1}{7}$

(C) 0

(D) -7

Section B — Everyday Mathematics and Reasoning

Q9–Q15 · 1 mark each

9. The balance below is level. Each bag holds the same unknown number of marbles, x , and each small circle is one marble. What is the value of x ?

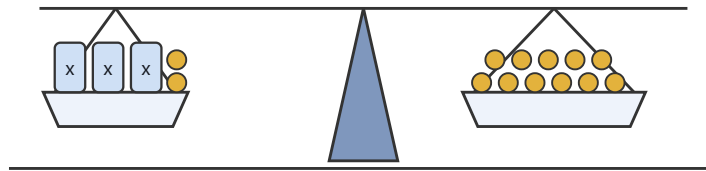


Fig. 9.1 — A balanced pair of pans (left: 3 bags + 2 marbles, right: 11 marbles)

(A) 2

(B) 3

(C) 4

(D) 5

10. The sum of two consecutive natural numbers is 75. The smaller number is _____.

(A) 36

(B) 37

(C) 38

(D) 39

11. A father is 3 times as old as his son. After 12 years he will be twice as old as his son. Find the son's present age.

(A) 10 years

(B) 16 years

(C) 14 years

(D) 12 years

12. The perimeter of a rectangle is 60 m and its length is twice its breadth. The breadth is _____.

(A) 10 m

(B) 15 m

(C) 20 m

(D) 30 m

13. A number increased by 15 gives 4 times the number. The number is _____.

(A) 3

(B) 5

(C) 10

(D) 15

14. Solve $\frac{x-1}{2} = \frac{x+3}{5}$.

(A) $x = \frac{3}{11}$

(B) $x = 3$

(C) $x = \frac{11}{3}$

(D) $x = 11$

15. Ravi had some money. He spent ₹45 and was left with ₹120. How much money did he have at first?

(A) ₹75

(B) ₹155

(C) ₹175

(D) ₹165

16. Consider the following statements.

- (i) A linear equation in one variable has exactly one solution.
- (ii) Adding the same number to both sides of an equation does not change its solution.
- (iii) The equation $2x + 3 = 2x + 5$ has a solution.

Which of the statements is/are correct?

- (A) (i) and (ii) only
- (B) (ii) and (iii) only
- (C) (i) and (iii) only
- (D) All three

17. The sum of the digits of a two-digit number is 9. If the digits are reversed, the new number is 27 **more** than the original number. Find the original number.

- (A) 27
- (B) 36
- (C) 45
- (D) 63

18. The numerator of a fraction is 4 less than its denominator. If 1 is added to both the numerator and the denominator, the fraction becomes $\frac{1}{2}$. Find the original fraction.

- (A) $\frac{3}{7}$
- (B) $\frac{4}{8}$
- (C) $\frac{5}{9}$
- (D) $\frac{2}{6}$

Answer Key

1	B	2	D	3	A	4	C	5	C
6	D	7	A	8	C	9	B	10	B
11	D	12	A	13	B	14	C	15	D
16	A	17	B	18	A				

Solutions

1. Answer: (B) 5

$$3x + 5 = 20$$

$$3x = 20 - 5 = 15$$

$$x = 15 \div 3 = 5.$$

$$\text{Check: } 3(5) + 5 = 20. \checkmark$$

2. Answer: (D) $5x - 7 = 3$

A linear equation in one variable has exactly one variable, raised only to the power 1. Only $5x - 7 = 3$ satisfies this. The first has x^2 , the second has two variables, and the fourth has the variable in a denominator.

3. Answer: (A) 28

Multiply both sides by 4:

$$x = 7 \times 4 = 28.$$

4. Answer: (C) 7

Divide both sides by 2: $x - 3 = 4$.

$$\text{So } x = 4 + 3 = 7.$$

$$\text{Check: } 2(7 - 3) = 2 \times 4 = 8. \checkmark$$

5. Answer: (C) $x = 6$

Bring the variable terms to one side and the numbers to the other:

$$5x - 3x = 9 + 3$$

$$2x = 12, \text{ so } x = 6.$$

$$\text{Check: LHS} = 5(6) - 3 = 27, \text{ RHS} = 3(6) + 9 = 27. \checkmark$$

6. Answer: (D) -4

$$x = 3 - 7 = -4. \text{ A solution may perfectly well be negative.}$$

7. Answer: (A) 7

Multiply both sides by 3:

$$2x + 1 = 15$$

$$2x = 14, \text{ so } x = 7.$$

8. Answer: (C) 0

Dividing both sides by 7 gives $x = 0 \div 7 = 0$. A product is zero only if one of the factors is zero, and $7 \neq 0$.

9. Answer: (B) 3

The two pans balance, so their contents are equal:

$$3x + 2 = 11$$

$$3x = 9, \text{ so } x = 3. \text{ Each bag holds 3 marbles.}$$

10. Answer: (B) 37

Let the numbers be x and $x + 1$.

$$x + (x + 1) = 75$$

$$2x + 1 = 75, \text{ so } 2x = 74 \text{ and } x = 37.$$

$$\text{The two numbers are 37 and 38, and } 37 + 38 = 75. \checkmark$$

11. Answer: (D) 12 years

Let the son's age be x , so the father's age is $3x$.

$$\text{After 12 years: } 3x + 12 = 2(x + 12)$$

$$3x + 12 = 2x + 24$$

$$x = 12 \text{ years.}$$

$$\text{Check: the father is now 36. In 12 years they will be 48 and 24, and } 48 = 2 \times 24. \checkmark$$

12. Answer: (A) 10 m

Let the breadth be b , so the length is $2b$.

$$\text{Perimeter} = 2(\text{length} + \text{breadth}) = 2(2b + b) = 6b$$

$$6b = 60, \text{ so } b = \mathbf{10 \text{ m}} \text{ (and the length is 20 m).}$$

13. Answer: (B) 5

Let the number be x .

$$x + 15 = 4x$$

$$15 = 3x, \text{ so } x = \mathbf{5}.$$

$$\text{Check: } 5 + 15 = 20 = 4 \times 5. \checkmark$$

14. Answer: (C) $x = \frac{11}{3}$

Cross-multiply:

$$5(x - 1) = 2(x + 3)$$

$$5x - 5 = 2x + 6$$

$$3x = 11, \text{ so } x = \frac{11}{3}.$$

15. Answer: (D) ₹165

Let the original amount be ₹ x .

$$x - 45 = 120$$

$$x = 120 + 45 = \mathbf{₹165}.$$

16. Answer: (A) (i) and (ii) only

Statement (i) is true — an equation of the form $ax + b = 0$ with $a \neq 0$ has the single solution $x = -b \div a$. Statement (ii) is true; this is the balancing rule used to solve equations. Statement (iii) is false; subtracting $2x$ from both sides leaves $3 = 5$, which is impossible, so there is no solution. Hence **(i) and (ii)**.

17. Answer: (B) 36

Let the tens digit be t and the units digit be u , so the number is $10t + u$.

$$\text{Given } t + u = 9. \dots(1)$$

Reversed number – original = 27:

$$(10u + t) - (10t + u) = 27$$

$$9u - 9t = 27, \text{ so } u - t = 3. \dots(2)$$

$$\text{Adding (1) and (2): } 2u = 12, \text{ so } u = 6 \text{ and } t = 3.$$

$$\text{The number is } \mathbf{36}. \text{ Check: } 63 - 36 = 27 \text{ and } 3 + 6 = 9. \checkmark$$

18. Answer: (A) $\frac{3}{7}$

Let the denominator be d , so the numerator is $d - 4$.

$$\text{Adding 1 to each: } \frac{d-3}{d+1} = \frac{1}{2}$$

$$\text{Cross-multiplying: } 2(d - 3) = d + 1$$

$$2d - 6 = d + 1, \text{ so } d = 7 \text{ and the numerator is } 7 - 4 = 3.$$

$$\text{The fraction is } \frac{3}{7}. \text{ Check: } \frac{4}{8} = \frac{1}{2}. \checkmark$$