Linear Equation in one Variable

QUESTIONS

1. Rajeshwar wrote an equation as $\frac{m}{5}=4$. Rajshekhar wrote a statement for Rajeshwar's equation. Which of these statements of Rajshekhar is correct?

(a) One-fifth of 'm' is 4. (b) One-fifth of a number is 5.

(c) One-fourth of 'm' is 4. (d) One-fourth of a number is 4.

2. What are the two steps involved in solving the equation $6p-4=14$

(a) Adding 4 on both the sides and then dividing both sides by 6.

(b) Subtracting 4 from both sides & then multiplying both sides by 6

(c) Subtracting 4 on the L.H.S. and multiplying by 6 on the R.H.S.

(d) Adding 4 on the L.H.S. and dividing by 6 on the R.H.S.

3. Which statement correctly represents the equation?

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

(a) Thrice of x equals two more than x

(b) Three more than x equals two less than x

(c) The product of three and two more than x equals two less than x.

(d) The product of three and two more than x equals two more than x.

4. Which statement correctly represents the equation $\frac{2}{3}(p+8)=6$?

(a) The sum of- and 8 more than p equals 6.

(b) The thirds the product of p and 8 equals 6.

(c) The sum of two thirds of p and 8 equals 6.

(d) Two thirds the sum of p and 8 equals 6.

5. What is the value of m for the equation $\frac{7}{2}(m+1)-4=24$?

(a) 5 (b) 6 (c) 7 (d) 8

6. What is the value of S of the equation $\frac{13}{32}S+\frac{15}{16}=5$?

(a) 8 (b) 9 (c) 10 (d) 11

7. The perimeter of a square is 12 cm less than the perimeter of a rectangle. Each side of the square is of length 16 cm. While the length of the rectangle is 20 cm, find its breadth?

(a) 12 cm (b) 14 cm (c) 16 cm (d) 18 cm

8. What is the value of K in the equation $4(K-6)=8$?

(a) 10 (b) 9 (c) 8 (d) 7

9. 7 subtracted from $\frac{5}{2}$ of a number results in 23, then what is the number?

(a) –10 (b) 10 (c) 12 (d) –12

10. A mango orchard is split into three blocks A, B & C. In block A, there are n trees, in block B, there are $(n+2)$ trees an in block C, there are $(n-2)$ trees.

Block A yields 120 mangoes per tree

Block B yields 60 mangoes per tree

Block C yields 180 mangoes per tree

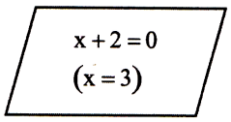
If the overall average yield per tree is 100 mangoes, find 'n'.

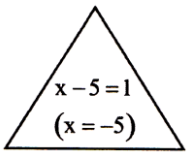
(a) 4 (b) 3 (c) 2 (d) 1

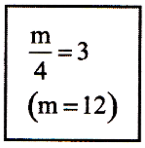
11. What is the value of 'x' in $\frac{2x-1}{5}-\frac{1+x}{2}=2-\frac{x-1}{2}$?

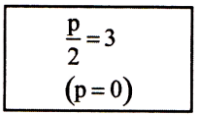
(a) 5 (b) –8 (c) 8 (d) –5

12. In each of these figures, the solution of an equation is given in brackets. Which of them is correct?

(a) 

(b) 

(c) 

(d) 

13. Which of the following rows is correctly matched?

Row	Equation	Solution
(a)	$3m+6=0$	$m=-5$

Row	Equation	Solution
(b)	$5r+10=½$	$r=9/2$

Row	Equation	Solution
(c)	$\frac{3x}{2}-3=6$	$x=6$

Row	Equation	Solution
(d)	$0..7x-1.3=0$	$x=2.1$

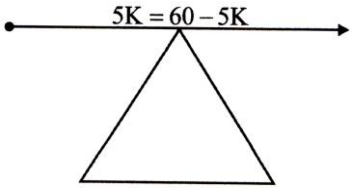
14. In a certain company, the number of females is eight more than one thirds the number of males. The number of females in the company is 22. If x is the number of male employees, which equation represents the given situation?

(a) $\frac{3}{1}x+22=8$ (b) $\frac{1}{3}x+8=22$ (c) $\frac{2}{3}x-8=22$ (d) $\frac{3}{2}x-22=8$

15. $10x+16=35$. What is the value of $10x-14$

(a) 15 (b) 05 (c) 14 (d) 16

16. In the see-saw shown below, the boy on the left weights '5K' kg whereas his friends on the right weight '60-5K' the; so that boy on the left weighs:



(a) 40 (b) 30 (c) 20 (d) 10

17. The ages of X and Y are in the ratio 1 : 2. After 8 years, their ages will be in the ratio 3 : 4. The sum of their present ages is

(a) 4 years (b) 24 years (c) 8 years (d) 12 years

18. 3 is subtracted from a number and the difference multiplied by 4. If 20 is added to the product and the sum is divided by 2, the result is equal to 10. Find the number.

(a) 3 (b) 4 (c) 5 (d) 6

19. $\frac{2}{5}$ is subtracted from a number and the difference is multiplied by 4. If 20 is added to the product and the sum is divide by 3, the result is equal to 10. Find the number.

(a) $\frac{29}{5}$ (b) $\frac{29}{10}$ (c) $\frac{6}{5}$ (d) $\frac{2}{3}$

20. A person travelled $\frac{5^{th}}{8}$ of the distance by train, $\frac{1^{th}}{4}$ by bus and the remaining 15 km by boat. Find the total distance travelled by him.

(a) 90 km (b) 120 km (c) 150 km (d) 180 km

21. The total cost of three prizes is 900. If the value of second prize is $\frac{1}{2}$ of the first and the value of 3rd prize is $\frac{3}{4}$ of the first prize, find the value of first prize.

(a) Rs. 200 (b) Rs. 300 (c) Rs. 400 (d) Rs. 450

22. Which of the following is an in equation?

(a) $2x+5=60$ (b) $2x+5<60$ (c) $2x+5>60$ (d) $2x+5\neq 65$

23. Choose the statement that best describes the equation $\frac{1}{4}p=10$.

(a) One - fourth of 10 is p (b) One - fourth of p is 3 more than 3.

(c) One - fourth of p is 10. (d) Four times p is 10.

24. Vinay's father is 44 years old. If he is 5 years older than thrice Vinay's age, which of these equations on solving will give Vinay's age?

(a) $3x+5=44$ (b) $44+2x=3x$ (c) $44-6y=5+3y$ (d) $3x-5=22$

25. Which of the following statements is true.

(a) The solution of $4x=60$ is 15

(b) $y=7$ satisfies the equation $y+0=-7$

(c) $p = \frac{5}{2}$ is the solution of $12p - 5 = 30$

(d) $m = \frac{3}{2}$ is the solution of $4\ (m+3) = \frac{3}{2}$

26. The average of 8,10,12,14 and A is 12. The value of A is

(a) 14 (b) 15 (c) 16 (d) 17

27. A number exceeds itself by 20 when added by 10% of itself. The number is

(a) 300 (b) 400 (c) 200 (d) 500

28. Ram and Shyam are two friends. Ram has Rs. 12 less than twice the amount of money that Shyam has. If shyam has Rs. p and Ram has Rs. 21, then which equation represents the given situation?

(a) $p/2 + 21 = 2 \times 12$ (b) $2p \pm 12 = 21$ (c) $p + 21 = 2 \times 12$ (d) $2p - 12 = 24$

29. In an ODI cricket match between India and Australia. India scored 10 runs more than six- fifth the runs scored by Australia. If India has scored 310 runs, India won the match by how many runs.

(a) 55 (b) 60 (c) 65 (d) 70

30. Amit has some toffees in his Pocket. He gives away 12 toffees to Akash which is two third the total number of toffees. How many toffees are left with Amit?

(a) 4 (b) 5 (c) 6 (d) 7

31. In a half yearly examination. Rajiv scored 36 marks less than twice the marks scored by Chitralekha. If Rajiv scored 224 marks, then how many marks were scored by Chitralekha.

(a) 110 (b) 120 (c) 130 (d) 140

32. If two -fifth of a number decreased by 12 is 50, what is the number?

(a) $162\ \frac{1}{2}$ (b) $185\ \frac{1}{2}$ (c) 155 (d) 160

33. What is the value of k in the equation $\frac{8}{7} = \frac{3}{4}(k-1)$

(a) $\frac{3}{2}$ (b) $\frac{53}{21}$ (c) $\frac{8}{21}$ (d) None of these

34. The breadth of a rectangle is 4 cm less than half of its length. The breadth of the rectangle is 14 cm. If the length of the rectangle is x cm, then which equation represents the given situation?

(a) $4 - \frac{x}{2} = 14$ (b) $\frac{x}{2} + 4 = 14$ (c) $\frac{x}{2} - 4 = 14$ (d) $x - \frac{1}{2} = 14$

35. Which of the following does not affect the given equation?

(a) Adding 0 on the L.H.S. and 1 on the R.H.S.

(b) Adding 1 on the L.H.S. and (-1) on the R.H.S.

(c) Adding the same number on both sides of the equation.

(d) Adding 0 on the R.H.S. and 1 on the L.H.S.

36. L = 0 is a simple linear equation. How many solutions does L have?

(a) 1 (b) 0 (c) 3 (d) infinitely many

37. A teacher asks the students of her class to write an equation for the statement Tenth of a number p is 100. Three students wrote the following equations. Which is correct?

(i) $\frac{p}{10} = 100$ (ii) $\frac{10}{2p} = 100$ (iii) $\frac{10}{p} = 50$

(a) (i) only (b) (ii) only (c) (iii) only (d) Both (i) and (iii).

38. If $O = \frac{2x+5}{7}$ and $P = \frac{3x-2}{4}$. What value of x makes $O = P$? (Where O and P denote two equations)

(a) $\frac{-17}{3}$ (b) $\frac{-34}{13}$ (c) $\frac{34}{13}$ (d) $\frac{17}{3}$

39. Given $A = P(1+rt)$, what is the value of 'r' when $A = 27$, $P = 18$ and $t = 5$?

(a) $\frac{11}{23}$ (b) $\frac{2}{9}$ (c) $\frac{27}{7}$ (d) $\frac{1}{10}$

40. The scale shows is balanced. Each cube on the left side weights the same amount.

How much does one of the cubes weight?

(a) 1 gram (b) 11 grams (c) 15 grams (d) 20 grams

ANSWER - KEY				
1. A	**2.** A	**3.** C	**4.** D	**5.** C
6. C	**7.** D	**8.** C	**9.** C	**10.** A
11. C	**12.** C	**13.** C	**14.** B	**15.** B
16. B	**17.** A	**18.** A	**19.** B	**20.** B
21. C	**22.** A	**23.** C	**24.** A	**25.** A
26. C	**27.** C	**28.** C	**29.** B	**30.** C
31. C	**32.** C	**33.** B	**34.** C	**35.** C
36. A	**37.** A	**38.** C	**39.** D	**40.** C

SOLUTIONS

1. (a) Not Available

2. (a) $6p-4+4=14+4$

$\Rightarrow 6p=18$

$\Rightarrow 6p\div 6=18\div 6$

$\Rightarrow p=3$

3. (c) Two more than $x \rightarrow x+2$

Product of 3 and two more than $x \rightarrow 3(x+2)$

Two less than $x \rightarrow (x-2)$

$\therefore 3(x+2)=(x-2)$

4. (d) sum of p and $8 \rightarrow (p+8)$

Two-third $\rightarrow \frac{2}{3}(p+8)$

$\frac{2}{3}(P+8)=6$

5. (c) $\frac{7}{2}(m+1)-4=24$

$\Rightarrow \frac{7}{2}(m+1)=28$

$\Rightarrow (m+1)=\frac{28\times 2}{7}$

$\Rightarrow (m+1)=8 \Rightarrow m=7$

6. (c) $\frac{13S}{32}+\frac{15}{16}=5 \Rightarrow \frac{135}{132}=5-\frac{15}{16}=\frac{65}{16}$

$\Rightarrow S=\frac{65}{16}\times\frac{32}{13}=5\times 2=10$

7. (d) : Square side $\rightarrow$ a : Rectangle sides 1 and b

$\Rightarrow 4a=2(1+b)-12$

$\Rightarrow 4\times 16=2(1+b)-12$

$\Rightarrow 38=(1+b)$

$\Rightarrow 38=20+b \Rightarrow b=18$

8. (c) $4(K-6)=8 \Rightarrow K-6=2 \Rightarrow K=8$

9. (c) Let the number be x.

$\Rightarrow \frac{5x}{2}-7=23$ $\Rightarrow \frac{5x}{2}=23+7$ $\Rightarrow x=30\times\frac{2}{5}=12$

10. (a) $\frac{n\times120+(n+2)60+(n-2)180}{3n}=100$

$\Rightarrow\frac{360n-240}{3n}=100$

$\Rightarrow 360n-240=300n$

$\Rightarrow 60n=240$

$\Rightarrow n=4$

Perfectness of a mathematician

A mathematician / Maths student should be able to cross check the correctness of his / her answer in exam hall itself.

Since $n=4,\ \Rightarrow\ n-2=2$

$\therefore$ Total mangoes $= 4\times120$ (Block A)

$+6\times60$ (Block B)

$+2\times1850$ (Block C)

$=1200$

Total tress $=4+6+2=12$

$\Rightarrow$ Overall average $=\frac{1200}{12}=100$

Which matches with data in the given question.

11. (c) $\frac{2x-1}{5}-\frac{1+x}{2}+\frac{x-1}{2}=2\Rightarrow\frac{2x-1}{5}-1=2$

$\Rightarrow\frac{2x-1}{5}=3$

$\Rightarrow 2x-1=15$

$\Rightarrow 2x=16$

$x=8$

12. (c) : $x+2=0\Rightarrow x=-2$ (not correct)

$x-5=1\Rightarrow x=1+5=6$ (not correct)

$\frac{m}{4}=3\Rightarrow m=3\times4=12$ (correct and hence answer)

$\frac{p}{2}=3\Rightarrow p=3\times2=6$ (not correct)

13. (c) $\frac{3x}{2}-3=6$

$\Rightarrow\frac{3x}{2}=9\Rightarrow x=\frac{9\times2}{3}=\frac{18}{3}=6$

14. (b) $\frac{1}{3}$ rd of males $=\frac{1}{3}x$

8 more then that $\rightarrow \frac{1}{3}x + 8 =$ number of females $= 22$

15. (b) $10x + 16 = 35$

$10x = 35 + 6$

$10x = 19$

$x = \frac{19}{10}$

$\therefore\ 10x - 14$

$\Rightarrow 10 \times \frac{19}{10} - 14$

$= 5$

16. (b) $5K = 60 - 5K \Rightarrow 10K = 60 \Rightarrow K = 6$

$\therefore 5K = 30$ (weight of boy on left)

17. (a) Let age of $X = x$

$\therefore$ age of $Y = 2x$

After 08 years age $(x) \rightarrow x + 8$

Age $(y) \rightarrow 2x + 8$

Now, $\frac{x+8}{2x+8} = \frac{3}{4} \Rightarrow 4x + 32 = 6x + 24$

$\Rightarrow 8 = 2x$

$4 = x$

Cross check by a mathematician

Put x = 4

$\Rightarrow \frac{x+8}{2x+8} = \frac{12}{16} = \frac{3}{4} = 3:4$

$\therefore$ It matches with data in question

18. (a) Let the number be x . Then according to the problem.

$\frac{(x-3)\times 4 + 20}{2} = 10$

$\Rightarrow (x-3)\times 4 = 0 \Rightarrow x = 3$

Cross-check as indicated in Ans. to Q. 17

19. (b) $\frac{\left(x - \frac{2}{5}\right)\times 4 + 20}{2} = 10$

$\Rightarrow \left(x - \frac{2}{5}\right)\times 4 + 20 = 30$

$\Rightarrow \left(x - \frac{2}{5}\right)\times 4 = 10$

$\Rightarrow x - \frac{2}{5} = \frac{5}{2}$

$\Rightarrow x = \frac{5}{2} + \frac{2}{5} = \frac{29}{10}$

Cross-check as in Ans. to Q.17

20. (b) Let the total distance be x km.

$\therefore x - \left(\frac{5x}{8} + \frac{x}{4}\right) = 15$ (Given)

$\Rightarrow x - \frac{7x}{8} = 15 \Rightarrow x = 120$

Cross - check as in Ans. to Q. 17

$x - \left(\frac{5x}{8} + \frac{x}{4} + 15\right)$

$\Rightarrow x = \frac{5x}{8} + \frac{x}{4} + 15$

21. (c) Let the first prize be x.

$\therefore$ Second prize $= \frac{1}{2}x$. Third prize $= \frac{3}{4}x$

$\therefore \left(x + \frac{x}{2} + \frac{3x}{4}\right) = 900$

$\Rightarrow \frac{8x + 4x + 6x}{8} = 900 \Rightarrow 900 \Rightarrow \frac{18x}{8} = 900$

$\Rightarrow x = \frac{900 \times 8}{18} = 400$

22. (a) (b) and (c) are in equations

23. (c) Not Available

24. (a) Not Available

25. (a) Not Available

26. (c) $\frac{(8 + 10 + 12 + 14 + A)}{5} = 12 \Rightarrow 44 + A = 60$

$\Rightarrow A = 16$

Cross check with A = 16.

Numbers are 8, 10, 12, 14, 16

Since numbers are equally spaces, middle number = 12 is average.

27. (c) Let number be x, then $x + \frac{10}{100} \times x = x + 20$

$\Rightarrow \frac{x}{10} = 20 \Rightarrow x = 200$

28. (c) Shyam $\rightarrow$ p, Ram

$\rightarrow 2p-12 \ \therefore 2p-12=21$

29. (b); Australia's runs $= x$

India's runs

$$=\frac{6}{5}x+10=310 \Rightarrow \frac{6}{5}x=300 \Rightarrow x=250$$

$\therefore$ win by $= \ 310-250=60$ runs

30. (c) Let Amit has 'x' toffees.

$$\therefore \frac{2}{3}x=12 \Rightarrow x=12\times\frac{3}{2}=18$$

$\therefore$ Toffees left with Amit $=18-12=6$

31. (c) Let Chitralekha obtain marks $= \ x$

$\therefore$ Rajiv's marks $= 2x-36$

$2x-36=224 \ \Rightarrow 2x=260 \ \Rightarrow x=130$

32. (c) $\frac{2}{5}x-12=50$

$$\therefore \frac{2x}{5}=62$$

$$\therefore x=\frac{62\times 5}{2}=31\times 5=155$$

33. (b) $\frac{8}{7}=\frac{3}{4}(K-l) \Rightarrow (K-1)=\frac{8}{7}\times\frac{4}{3}=\frac{32}{21}$

$$\Rightarrow K=\frac{32}{21}+1=\frac{53}{21}$$

Note: Student is advised to cross – check

34. (c) $y=\frac{x}{2}-4=14$

35. (c) Not Available

36. (a) A linear equation has only one variable of degree 1. So it has only one solution.

37. (a) Not Available

38. (c) $O=P \Rightarrow \frac{2x+5}{7}=\frac{3x-2}{4}$

$$\Rightarrow 4(2x+5)=7(3x-2)$$

$$\Rightarrow 8x+20=21x-14 \Rightarrow 20+14=21x-8x$$

$$\Rightarrow 13x=34 \Rightarrow x=\frac{34}{13}$$

39. (d) $A=P(1+rt) \Rightarrow 27=18(1+5r) \Rightarrow r=\frac{27-18}{18}\times\frac{1}{5}=\frac{1}{2}\times\frac{1}{5}=\frac{1}{10}$

40. (c) Let x be the weight of each cube.

Then $6x=90 \Rightarrow x=15$ *gms*