

# CHAPTER 13

## LINEAR EQUATIONS

### More Questions for Practice

1. Solve the following equations:

$$(i) \frac{x-1}{2} - \frac{3x-12}{3} = 1$$

$$(ii) 0.5x + \frac{x}{4} = 0.25x + 2$$

$$(iii) 1\frac{4}{5}x - \frac{x+2}{7} = \frac{3x+1}{2}$$

$$(iv) \frac{x-1}{2} = 1 + \frac{x-2}{3}$$

$$(v) x + 1.5(x-3) = 20.5$$

$$(vi) \frac{3(2x-1)}{4} - \frac{4(2x-1)}{5} = \frac{x-3}{6}$$

2. Solve the following equations:

$$(i) \frac{8}{x} = \frac{9}{2x-1}$$

$$(ii) \frac{2}{x-7} = \frac{3}{x-4}$$

$$(iii) \frac{0.4y-3}{1.5y+9} = -\frac{7}{5}$$

$$(iv) \frac{3(x-2)}{x} = 1\frac{1}{2}$$

$$(v) \frac{7}{3x-4} = 3.5$$

$$(vi) \frac{5}{2x+3} = \frac{2}{3x-1}$$

3. Solve the following equations:

$$(i) \frac{1}{10}(x-1) - \frac{2}{15}(x+1) = \frac{3}{20}$$

$$(ii) \frac{1}{m} + \frac{2}{m+2} - \frac{3}{m-2} = 0$$

$$(iii) \frac{2x-3}{3x-1} = \frac{2x+3}{3x+4}$$

$$(iv) \frac{3}{2x-1} + \frac{4}{2x+1} = \frac{7}{2x}$$

4. A seed store has 300 kg of lawn-seed mixture that is  $\frac{3}{4}$  rye grass and  $\frac{1}{4}$  blue grass. How much blue grass must be added to make a mixture that is  $\frac{1}{2}$  rye grass and  $\frac{1}{2}$  blue grass?
5. An inlet pipe can fill a water tank in 10 hours, while an outlet pipe can empty the same tank in 15 hours. By mistake both the pipes are left open. How long will it take to fill the water tank?
6. (i) At a fair, a boy tries his skill in shooting. He was to receive 20 paise for hitting the *bull's eye* and had to pay 8 paise for missing the *bull's eye*. He tried 50 shots but received only 20 paise. How many times did he hit the *bull's eye*?
- (ii) I was to give one mark for every sum right, and to deduct one mark for every sum wrong. After working 36 sums the total marks equalled to 4. How many sums had been done correctly?
- (iii) There are 90 *multiple-choice questions* in a test (a multiple-choice question is one for which some choices (a), (b), etc., are given and you have to select the correct one). Suppose you get two marks for every correct answer and, for every question you leave unattempted or answer wrong, one mark is deducted from your total score of correct answers. If you get a zero in the test, then how many questions did you answer correctly?

7. Last year the prices of two houses were in the ratio 16 : 23. This year the price of the first house has risen by 25% and that of the second house by ₹ 5200 and the ratio of their new prices is 9 : 11. Find their last year's prices.
8. The digit in the units place of a two-digit number is 4 times the digit in the tens place. If the digits are reversed and the original number is subtracted from the new number, the difference is 54. What is the original number?
9. The distance between cities  $A$  and  $B$  is 290 km. Two motorcyclists start simultaneously from  $A$  and  $B$  in opposite directions and the distance between them after 3 hours is 20 km. If the speed of one motorcyclist is less than that of the other by 10 km/h, find their speeds.
10. Smriti's mother gave her ₹ 245 for buying New Year cards. If she got some ten-rupee cards, two-thirds as many five-rupee cards and one-fifth as many fifteen-rupee cards, how many cards of each denomination did she buy?
11. Solve the following equations and check the solutions:
- (i)  $\frac{50}{x+5} = \frac{2}{x}$       (ii)  $\frac{7-4x}{9-3x} = \frac{2}{5}$       (iii)  $\frac{9-x}{2} + \frac{3}{2} = \frac{7+x}{2}$
12. The denominator of a fraction is 14 more than its numerator. If both the numerator and the denominator are increased by 5, the new fraction becomes  $\frac{11}{18}$ . Find the original fraction.
13. A rectangular room is 6 m longer than its width. If each dimension is increased by 2 m, the area of the floor of the room will increase by 64 sq m. Find the original dimensions of the room.
14. An aeroplane flies 3500 km in the same time that a train takes to travel 600 km. If the aeroplane flies 50 km an hour more than five times the speed of the train, what are the speeds of the train and the aeroplane?
15. Two trains start simultaneously from two stations 300 km apart, and move towards each other. The speed of one train is more than the other by 20 km/h. If the distance between the trains after two hours is 20 km, find the speeds of the trains.
16. A 90 l solution has 10% salt. How much water must be evaporated to leave the solution with 20% salt?
17. A fruit vendor buys some oranges at the rate of ₹ 5 per orange. He also buys an equal number of bananas at the rate of ₹ 2 per banana. He makes 20% profit on oranges and 15% profit on bananas. At the end of the day, all the fruits are sold out. His total profit is ₹ 390. Find the number of oranges purchased.
18. I think of a whole number, then square it and add to the original number. If the result is 56, what number did I think of?

## ANSWERS

1. (i)  $x = 5$  (ii)  $x = 4$  (iii)  $x = 5$  (iv)  $x = 5$  (v)  $x = 10$  (vi)  $x = \frac{33}{16}$
2. (i)  $x = \frac{8}{7}$  (ii)  $x = 13$  (iii)  $y = \frac{-96}{25}$  (iv)  $x = 4$  (v)  $x = 2$  (vi)  $x = 1$
3. (i)  $x = -\frac{23}{2}$  (ii)  $m = -\frac{2}{5}$  (iii)  $x = -\frac{9}{8}$  (iv)  $x = \frac{7}{2}$  4. 150 kg 5. 30 hours
6. (i) 15 (ii) 20 sums (iii) 30 questions 7. ₹ 57600, ₹ 82800
8. 28 9. 40 km/h; 50 km/h
10. 15 cards of ₹ 10; 10 cards of ₹ 5 and 3 cards of ₹ 15 each.
11. (i)  $x = \frac{5}{24}$  (ii)  $x = \frac{17}{14}$  (iii)  $x = \frac{5}{2}$
13.  $\frac{17}{31}$  13. 18 m, 12 m 14. 60 km/h, 350 km/h 15. 60 km/h, 80 km/h
16. 45 l 17. 300 18. 7.

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