

EXERCISE 2.1

Solve the following equations.

1. $x - 2 = 7$

3. $6 = z + 2$

5. $6x = 12$

7. $\frac{2x}{3} = 18$

9. $7x - 9 = 16$

11. $17 + 6p = 9$

2. $y + 3 = 10$

4. $\frac{3}{7} + x = \frac{17}{7}$

6. $\frac{t}{5} = 10$

8. $1.6 = \frac{y}{1.5}$

10. $14y - 8 = 13$

12. $\frac{x}{3} + 1 = \frac{7}{15}$

TEST YOURSELF (LE-1)

Solve the following simple equations:

(i) $6m = 12$

(iii) $-5y = 30$

(v) $34x = -51$

(vii) $\frac{2x}{3} = 18$

(ix) $3p - 7 = 0$

(xi) $200y - 51 = 49$

(xiii) $7x - 9 = 16$

(xv) $4x - \frac{5}{3} = 9$

(ii) $14p = -42$

(iv) $-2x = -12$

(vi) $\frac{n}{7} = -3$

(viii) $3x + 1 = 16$

(x) $13 - 6n = 7$

(xii) $11n + 1 = 1$

(xiv) $8x + \frac{5}{2} = 13$

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

EXERCISE 2.2

1. If you subtract $\frac{1}{2}$ from a number and multiply the result by $\frac{1}{2}$, you get $\frac{1}{8}$.
What is the number?

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2. The perimeter of a rectangular swimming pool is 154 m. Its length is 2m more than twice its breadth. What are the length and the breadth of the pool?
3. The base of an isosceles triangle is $\frac{4}{3}$ cm. The perimeter of the triangle is $4\frac{2}{15}$ cm. What is the length of either of the remaining equal sides?
4. Sum of two numbers is 95. If one exceeds the other by 15, find the numbers.
5. Two numbers are in the ratio 5 : 3. If they differ by 18, what are the numbers?
6. Three consecutive integers add up to 51. What are these integers?
7. The sum of three consecutive multiples of 8 is 888. Find the multiples.
8. Three consecutive integers are such that when they are taken in increasing order and multiplied by 2, 3 and 4 respectively, they add up to 74. Find these numbers.
9. The ages of Rahul and Haroon are in the ratio 5 : 7. Four years later the sum of their ages will be 56 years. What are their present ages?
10. The number of boys and girls in a class are in the ratio 7 : 5. The number of boys is 8 more than the number of girls. What is the total class strength?
11. Baichung's father is 26 years younger than Baichung's grandfather and 29 years older than Baichung. The sum of the ages of all the three is 135 years. What is the age of each one of them?
12. Fifteen years from now Ravi's age will be four times his present age. What is Ravi's present age?
13. A rational number is such that when you multiply it by $\frac{5}{2}$ and add $\frac{2}{3}$ to the product, you get $-\frac{7}{12}$. What is the number?
14. Lakshmi is a cashier in a bank. She has currency notes of denominations Rs 100, Rs 50 and Rs 10, respectively. The ratio of the number of these notes is 2 : 3 : 5. The total cash with Lakshmi is Rs 4,00,000. How many notes of each denomination does she have?
15. I have a total of Rs 300 in coins of denomination Re 1, Rs 2 and Rs 5. the number of Rs 2 coins is 3 times the number of Rs 5 coins. The total number of Rs 5 coins. The total number of coins is 160. How many coins of each denomination are with me?
16. The organisers of an essay competition decide that a winner in the competition gets a prize of Rs 100 and a participant who does not win gets a prize of Rs 25. The total prize money distributed is Rs 3,000. Find the number of winners, if the total number of participants is 63.

TEST YOURSELF (LE-2)

1. The difference between two numbers is 8. If 2 is added to the bigger number the result will be three times the smaller number. Find the numbers.
2. What are those two numbers whose sum is 58 and difference is 28?
3. The sum of two consecutive odd numbers is 56. Find the numbers.
4. The sum of three consecutive multiples of 7 is 777. Find these multiples.
(Hint: Three consecutive multiples of 7 are ' x ', ' $x + 7$ ', ' $x + 14$ ')
5. A man walks 10 km, then travels a certain distance by train and then by bus as far as twice by the train. If the whole journey is of 70 km, how far did he travel by train?
6. Vinay bought a pizza and cut it into three pieces. When he weighed the first piece he found that it was 7g lighter than the second piece and 4g heavier than the third piece. If the whole pizza weighed 300g. How much did each of the three pieces weigh?
(Hint: weight of normal piece be ' x ' then weight of largest piece is ' $x + 7$ ', weight of the smallest piece is ' $x - 4$ ')
7. The distance around a rectangular field is 400 meters. The length of the field is 26 meters more than the breadth. Calculate the length and breadth of the field?
8. The length of a rectangular field is 8 meters less than twice its breadth. If the perimeter of the rectangular field is 56 meters, find its length and breadth?
9. Two equal sides of a triangle are each 5 meters less than twice the third side. If the perimeter of the triangle is 55 meters, find the length of its sides?
10. Two complementary angles differ by 12° , find the angles?
11. The ages of Rahul and Laxmi are in the ratio 5 : 7. Four years later, the sum of their ages will be 56 years. What are their present ages?
12. There are 180 multiple choice questions in a test. A candidate gets 4 marks for every correct answer, and for every un-attempted or wrongly answered questions one mark is deducted from the total score of correct answers. If a candidate scored 450 marks in the test how many questions did he answer correctly?
13. A sum of ₹ 500 is in the form of denominations of ₹ 5 and ₹ 10. If the total number of notes is 90 find the number of notes of each denomination.
(Hint: Let the number of 5 rupee notes be ' x ', then number of 10 rupee notes = $90 - x$)

EXERCISE 2.3

Solve the following equations and check your result.

1. $3x = 2x + 18$
2. $5t - 3 = 3t - 5$
3. $5x + 9 = 5 + 3x$
4. $4z + 3 = 6 + 2z$
5. $2x - 1 = 14 - x$
6. $8x + 4 = 3(x - 1) + 7$
7. $x = \frac{4}{5}(x + 10)$
8. $\frac{2x}{3} + 1 = \frac{7x}{15} + 3$
9. $2y + \frac{5}{3} = \frac{26}{3} - y$
10. $3m = 5m - \frac{8}{5}$

TEST YOURSELF (LE-3)

Solve the following equations:

1. $7x - 5 = 2x$
2. $5x - 12 = 2x - 6$
3. $7p - 3 = 3p + 8$
4. $8m + 9 = 7m + 8$
5. $7z + 13 = 2z + 4$
6. $9y + 5 = 15y - 1$
7. $3x + 4 = 5(x - 2)$
8. $3(t - 3) = 5(2t - 1)$
9. $5(p - 3) = 3(p - 2)$
10. $5(z + 3) = 4(2z + 1)$
11. $15(x - 1) + 4(x + 3) = 2(7 + x)$
12. $3(5z - 7) + 2(9z - 11) = 4(8z - 7) - 111$
13. $8(x - 3) - (6 - 2x) = 2(x + 2) - 5(5 - x)$
14. $3(n - 4) + 2(4n - 5) = 5(n + 2) + 16$

EXERCISE 2.4

1. Amina thinks of a number and subtracts $\frac{5}{2}$ from it. She multiplies the result by 8. The result now obtained is 3 times the same number she thought of. What is the number?
2. A positive number is 5 times another number. If 21 is added to both the numbers, then one of the new numbers becomes twice the other new number. What are the numbers?
3. Sum of the digits of a two-digit number is 9. When we interchange the digits, it is found that the resulting new number is greater than the original number by 27. What is the two-digit number?

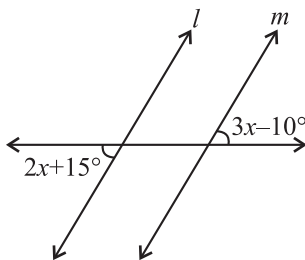
4. One of the two digits of a two digit number is three times the other digit. If two interchange the digits of this two-digit number and add the resulting number to the original number, you get 88. What is the original number?
5. Shobo's mother's present age is six times Shobo's present age. Shobo's age five years from now will be one third of his mother's present age. What are their present ages?
6. There is a narrow rectangular plot, reserved for a school, in Mahuli village. The length and breadth of the plot are in the ratio 11 : 4. At the rate Rs 100 per metre it will cost the village panchayat Rs 75000 to fence the plot. What are the dimensions of the plot?
7. Hasan buys two kinds of cloth materials for school uniforms, shirt material that costs him Rs 50 per metre and trouser material that costs him Rs 90 per metre.

For every 2 meters of the trouser material he buys 3 metres of the shirt material. He sells the materials at 12% and 10% profit respectively. His total sale is Rs 36,660. How much trouser material did he buy?

8. Half of a herd of deer are grazing in the field and three fourths of the remaining are playing nearby. The rest 9 are drinking water from the pond. Find the number of deer in the herd.
9. A grandfather is ten times older than his granddaughter. He is also 54 years older than her. Find their present ages.
10. Aman's age is three times his son's age. Ten years ago he was five times his son's age. Find their present ages.

TEST YOURSELF (LE-4)

1. Find the value of 'x' so that $l \parallel m$.



2. Eight times of a number reduced by 10 is equal to the sum of six times the number and 4. Find the number.

3. A number consists of two digits whose sum is 9. If 27 is subtracted from the number its digits are reversed. Find the number.
4. A number is divided into two parts such that one part is 10 more than the other. If the two parts are in the ratio 5 : 3, find the number and the two parts.
5. When I triple a certain number and add 2, I get the same answer as I do when I subtract the number from 50. Find the number.
6. Mary is twice older than her sister. In 5 years time, she will be 2 years older than her sister. Find how old are they both now.
7. In 5 years time, Reshma will be three times old as she was 9 years ago. How old is she now?
8. A town's population increased by 1200 people, and then this new population decreased 11%. The town now had 32 less people than it did before the 1200 increase. Find the original population.
9. A man on his way to dinner shortly after 6.00 p.m. observes that the hands of his watch form an angle of 110° . returning before 7.00 p.m. he notices that again the hands of his watch form an angle of 110° . Find the number of minutes that he has been away.

EXERCISE 2.5

Solve the following linear equations.

1. $\frac{x}{2} - \frac{1}{5} = \frac{x}{3} + \frac{1}{4}$

2. $\frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$

3. $x + 7 - \frac{8x}{3} = \frac{17}{6} - \frac{5x}{2}$

4. $\frac{x-5}{3} = \frac{x-3}{5}$

5. $\frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$

6. $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$

Simplify and solve the following linear equations.

7. $3(t-3) = 5(2t+1)$

8. $15(y-4) - 2(y-9) + 5(y+6) = 0$

9. $3(5z-7) - 2(9z-11) = 4(8z-13) - 17$

10. $0.25(4f-3) = 0.5(10f-9)$

TEST YOURSELF (LE-5)

Solve the following equations.

(i) $\frac{n}{5} - \frac{5}{7} = \frac{2}{3}$

(ii) $\frac{x}{3} - \frac{x}{4} = 14$

(iii) $\frac{z}{2} + \frac{z}{3} - \frac{z}{6} = 8$

(iv) $\frac{2p}{3} - \frac{p}{5} = 11\frac{2}{3}$

(v) $9\frac{1}{4} = y - 1\frac{1}{3}$

(vi) $\frac{x}{2} - \frac{4}{5} + \frac{x}{5} + \frac{3x}{10} = \frac{1}{5}$

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

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

(ix) $\frac{8p-5}{7p+1} = \frac{-2}{4}$

(x) $\frac{7y+2}{5} = \frac{6y-5}{11}$

(xi) $\frac{x+5}{6} - \frac{x+1}{9} = \frac{x+3}{4}$

(xii) $\frac{3t+1}{16} - \frac{2t-3}{7} = \frac{t+3}{8} + \frac{3t-1}{14}$

EXERCISE 2.6

Solve the following equations.

1. $\frac{8x-3}{3x} = 2$

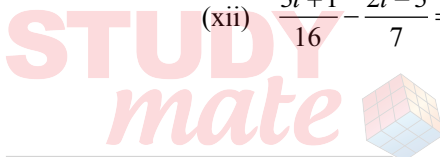
2. $\frac{9x}{7-6x} = 15$

3. $\frac{z}{z+15} = \frac{4}{9}$

4. $\frac{3y+4}{2-6y} = \frac{-2}{5}$

5. $\frac{7y+4}{y+2} = \frac{-4}{3}$

6. The ages of Hari and Harry are in the ratio 5 : 7. Four years from now the ratio of their ages will be 3 : 4. Find their present ages.

 7. The denominator of a rational number is greater than its numerator by 8. If the numerator is increased by 17 and the denominator is decreased by 1, the number obtained is $\frac{3}{2}$. Find the rational number.


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NCERT Textual Exercises and Assignments

Exercise – 2.1

1. (i) $x - 2 = 7$

$$\Rightarrow x - 2 + 2 = 7 + 2$$

[Adding 2 both side]

$$\Rightarrow x = 9$$

2. $y + 3 = 10$

$$\Rightarrow y + 3 - 3 = 10 - 3$$

[Subtracting 3 both side]

$$\Rightarrow y = 7$$

3. $6 = z + 2$

$$\Rightarrow 6 - 2 = z + 2 - 2$$

[Subtracting 2 both sides]

$$\Rightarrow 4 = z \Rightarrow z = 4$$

4. $\frac{3}{7} + x = \frac{17}{7}$

$$\Rightarrow x + \frac{3}{7} - \frac{3}{7} = \frac{17}{7} - \frac{3}{7}$$

[Subtracting $\frac{3}{7}$ both sides]

$$\Rightarrow x = \frac{17-3}{7} \Rightarrow x = \frac{14}{7} \Rightarrow x = 2$$

5. $6x = 12$

$$\Rightarrow \frac{x}{6} = \frac{12}{6}$$

[Dividing both sides by 6]

$$\Rightarrow x = 2$$

6. $\frac{t}{5} = 10$

$$\Rightarrow \frac{t}{5} \times 5 = 10 \times 5$$

[Multiplying both sides by 5]

$$\Rightarrow t = 50$$

7. $\frac{2x}{3} = 18$

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

[Multiplying both sides by 3]

$$\Rightarrow 2x = 18 \times 3$$

$$\frac{2x}{2} = \frac{18 \times 3}{2}$$

[Dividing both sides 2]

$$\Rightarrow x = 27$$

8. $y = 1.6 \times 1.5$

$$y = 2.4$$

9. $7x - 9 = 16$

$$\Rightarrow 7x - 9 + 9 = 16 + 9$$

[Adding 9 both sides]

$$\Rightarrow x = \frac{25}{7}$$

10. $14y - 8 = 13$

$$\Rightarrow 14y - 8 + 8 = 13 + 8$$

[Adding 8 both sides]

$$\Rightarrow 14y = 21$$

$$\Rightarrow y = \frac{21}{14} = \frac{3}{2}$$

11. $17 + 6p = 9$

$$\Rightarrow 17 + 6p - 17 = 9 - 17$$

[Subtracting 17 from both sides]

$$\Rightarrow 6p = -8$$

$$\Rightarrow p = \frac{-4}{3}$$

12. $\frac{x}{3} + 1 = \frac{7}{15}$


$$\Rightarrow \frac{x}{3} = \frac{7}{15} - 1$$

$$\Rightarrow \frac{x}{3} = \frac{7-15}{15}$$

$$\Rightarrow \frac{x}{3} = \frac{-8}{15}$$

$$\Rightarrow x = \frac{-8 \times 3}{15}$$

$$\Rightarrow x = \frac{-8}{5}$$

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Exercise – 2.2

- Let the number be x .
According to the question,

$$\frac{1}{2} \times \left(x - \frac{1}{2} \right) = \frac{1}{8}$$

$$\Rightarrow \frac{x}{2} - \frac{1}{4} = \frac{1}{8}$$

$$\Rightarrow \frac{x}{2} = \frac{1}{8} + \frac{1}{4}$$

$$\Rightarrow \frac{x}{2} = \frac{1+2}{8}$$

$$\Rightarrow x = \frac{3}{4}$$

Hence, the required number is $\frac{3}{4}$.

2. Let the breadth of the pool be x m.

Then, the length of the pool = $(2x + 2)$ m

Perimeter = $2(l + b)$

$$\Rightarrow 154 = 2(2x + 2 + x)$$

$$\Rightarrow 77 = 3x + 2$$

$$\Rightarrow 75 = 3x$$

$$\Rightarrow x = 25$$

Hence, length of the pool = $2x + 2 = 2 \times 25 + 2 = 50 + 2 = 52$ m

And, breadth of the pool = 25 m

3. Let each of equal sides of an isosceles triangle be x cm.

Perimeter of a triangle = Sum of all three sides

$$\Rightarrow x + x + \frac{4}{3} = \frac{62}{15}$$

$$\Rightarrow 2x = \frac{62}{15} - \frac{4}{3}$$

$$\Rightarrow 2x = \frac{62 - 20}{15}$$

$$\Rightarrow 2x = \frac{42}{15}$$

$$\Rightarrow x = \frac{21}{15} = \frac{7}{5}$$

Hence, each equal side of an isosceles triangle is $\frac{7}{5}$ cm.

4. Sum of two number = 95

Let the first number be x , then another number be $x + 15$.

According to the question, $x + x + 15 = 95$

$$\Rightarrow 2x + 15 = 95$$

$$\Rightarrow 2x + 15 - 15 = 95 - 15$$

[Subtracting 15 from both sides]

$$\Rightarrow 2x = 80$$

$$\Rightarrow x = 40$$

Hence, the first number = 40

And another number = $40 + 15 = 55$

5. Let the two numbers be $5x$ and $3x$.

According to question, $5x - 3x = 18$

$$\Rightarrow 2x = 18$$

[Dividing both sides by 2]

$$\Rightarrow x = 9$$

Hence, first number = $5 \times 9 = 45$ and second number = $3 \times 9 = 27$.

6. Let the three consecutive integers be x , $x + 1$ and $x + 2$.

According to the question, $x + x + 1 + x + 2 = 51$

$$\Rightarrow 3x + 3 = 51$$

$$\Rightarrow 3x = 48$$

$$\Rightarrow x = 16$$

Hence, first integer = 16, second integer = $16 + 1 = 17$ and third integer = $16 + 2 = 18$.

7. Let the three consecutive multiples of 8 be x , $x + 8$ and $x + 16$.

According to question,

$$\Rightarrow x + x + 8 + x = 16 = 888$$

$$\Rightarrow 3x + 24 = 888$$

$$\Rightarrow 3x = 864$$

$$\Rightarrow x = 288$$

Hence, first multiple of 8 = 288, second multiple of 8 = $288 + 8 = 296$ and third multiple of 8 = $288 + 16 = 304$.

8. Let the three consecutive integers be x , $x + 1$ and $x + 2$.

According to the question, $2x + 3(x + 1) + 4(x + 2) = 74$

$$\Rightarrow 2x + 3x + 3 + 4x + 8 = 74 \Rightarrow 9x + 11 = 74$$

$$\Rightarrow 9x = 63$$

$$\Rightarrow x = 7$$

Hence first integer = 7, second integer = $7 + 1 = 8$

and third integer = $7 + 2 = 9$.

9. Let the present age of Rahul and Haroon be $5x$ years and $7x$ years respectively.

According to condition, $(5x + 4) + (7x + 4) = 56$

$$\Rightarrow 12x + 8 = 56$$

$$\Rightarrow 12x = 48$$

$$\Rightarrow x = 4$$

Hence, present age of Rahul = $5 \times 4 = 20$ years and
present age of Harron = $7 \times 4 = 28$ years.

10. Let the number of girls be x .

Then, the number of boys = $x + 8$.

According to the questions,

$$\Rightarrow 5(x + 8) = 7x \Rightarrow 5x + 40 = 7x$$

$$\Rightarrow 5x - 7x = -40$$

$$\Rightarrow -2x = -40$$

$$\Rightarrow x = 20$$

Hence the number of girls = 20 and number of boys = $20 + 8 = 28$.

11. Let Baichung's age be x years, then Baichung's father's age = $(x + 29)$ years and Baichung's granddaughter's age = $(x + 29 + 26) = (x + 55)$ years.

According to condition, $x + x + 29 + x + 55 = 135$

$$\Rightarrow 3x + 84 = 135$$

$$\Rightarrow 3x = 51$$

$$\Rightarrow x = 17 \text{ years}$$

Hence, Baichung's age = 17 years, Baichung's father's age = $17 + 29 = 46$ years. and Baichung's granddaughter's age = $17 + 29 + 26 = 72$ years.

12. Let Ravi's present age be x years.

After fifteen years, Ravi's age = $4x$ years.

Fifteen years from now, Ravi's age = $(x + 15)$ years.

According to question, $4x = x + 15$

$$\Rightarrow 4x - x = 15$$

[Transposing x to L.H.S.]

$$\Rightarrow 3x = 15$$

$$\Rightarrow x = 5 \text{ years}$$

Hence, Ravi's present age be 5 years.

13. Let the rational number be x .

According to the question,

$$\left(x \times \frac{5}{2}\right) + \frac{2}{3} = \frac{-7}{12}$$

$$\Rightarrow \frac{5x}{2} + \frac{2}{3} = \frac{-7}{12}$$

$$\Rightarrow \frac{5x}{2} = \frac{-7}{12} - \frac{2}{3}$$

$$\Rightarrow \frac{5x}{2} = \frac{-7-8}{12}$$

$$\Rightarrow \frac{5x}{2} = \frac{-15}{12}$$

$$\Rightarrow x = \frac{-15 \times 2}{12 \times 5}$$

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

Hence, the rational number is $-1/2$.

14. Let number of notes be $2x$, $3x$ and $5x$.

According to questions,

$$(100 \times 2x) + (50 \times 3x) + (10 \times 5x) = 4,00,000$$

$$\Rightarrow 200x + 150x + 50x = 4,00,000$$

$$\Rightarrow 400x = 4,00,000$$

$$\Rightarrow x = 1000$$

Hence, number of denominations of ₹100 notes = $2 \times 1000 = 2000$

Number of denominations of ₹ 50 notes = $3 \times 1000 = 3000$

Number of denominations of ₹ 10 notes = $5 \times 1000 = 5000$

Therefore, required denominations of notes of ₹ 100, ₹ 50 and ₹ 10 are 2000, 3000 and 5000 respectively.

15. Total sum of money = ₹ 300

Let the number of ₹ 5 coins be x , number of ₹ 2 coins be $3x$ and number of ₹ 1 coins be $160 - (x + 3x) = 160 - 4x$

According to questions,

$$5x + 2(3x) + 1(160 - 4x) = 300$$

$$\Rightarrow 5x + 6x + 160 - 4x = 300$$

$$\Rightarrow 7x + 160 = 300$$

$$\Rightarrow 7x = 140$$

$$\Rightarrow x = 20$$

Hence, the number of coins of ₹5 denomination = 20

Number of coins of ₹2 denomination = $3 \times 20 = 60$

Number of coins of ₹1 denomination = $160 - 4 \times 20 = 160 - 80 = 80$

16. Total sum of money = ₹3000

Let the number of winners of ₹100 be x .

And those who are not winners = $63 - x$

According to the question,

$$(100 \times x) + 25 \times (63 - x) = 3000$$

$$\Rightarrow 100x + 1575 - 25x = 3000$$

$$\Rightarrow 75x + 1575 = 3000$$

$$\Rightarrow 7x + 1575 - 1575 = 3000 - 1575 \quad [\text{Subtracting } 1575 \text{ from both sides}]$$

$$\Rightarrow 7x = 1425$$

$$\Rightarrow x = 19$$

Hence the number of winner is 19.

Exercise – 2.3

1. $3x = 2x + 18$

$$\Rightarrow 3x - 2x = 18$$

$$\Rightarrow x = 18$$

To check :

$$\Rightarrow 3x = 2x + 18$$

$$\Rightarrow 3 \times 18 = 2 \times 18 + 18$$

$$\Rightarrow 54 = 36 + 18$$

$$\Rightarrow 54 = 54$$

$$\text{L.H.S.} = \text{R.H.S.}$$

Hence, it is correct.

2. $5t - 3 = 3t - 5$

$$\Rightarrow 5t - 3t = -5 + 3$$

$$\Rightarrow 2t = -2$$

$$= t = -2$$

To check :

$$5t - 3 = 3t - 5$$

$$\Rightarrow 5 \times (-2) - 3 = 3 \times (-2) - 5$$

$$\Rightarrow -5 - 3 = -3 - 5$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Hence, it is correct.

3. $5x + 9 = 5 + 3x$

$$\Rightarrow 2x = -4$$

$$\Rightarrow x = -2$$

To check :

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

$$\Rightarrow 5 \times (-2) + 9 = 5 + 3 \times (-2)$$

$$\Rightarrow -10 + 9 = 5 - 6$$

$$\Rightarrow -1 = -1$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

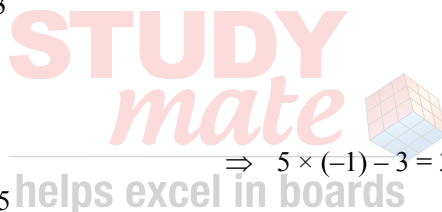
Hence, it is correct

4. $4z + 3 = 6 + 2z$

$$\Rightarrow 4z - 2z = 6 - 3$$

$$\Rightarrow 2z = 3$$

$$\Rightarrow z = \frac{3}{2}$$



To check :

$$4z + 3 = 6 + 2z$$

$$\Rightarrow (2 \times 3) + 3 = 6 + 3$$

$$\Rightarrow 6 + 3 = 9$$

$$\Rightarrow 9 = 9$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Hence, it is correct.

5. $2x - 1 = 14 - x$

$$\Rightarrow 2x + x = 14 + 1$$

$$\Rightarrow 3x = 15$$

To check :

$$2x - 1 = 14 - x \qquad \qquad \qquad \Rightarrow 2 \times 5 - 1 = 14 - 5$$

$$\Rightarrow 10 - 1 = 9 \qquad \qquad \qquad \Rightarrow 9 = 9$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.} \quad \text{Hence, it is correct.}$$

6. $8x + 4 = 3(x - 1) + 7$

$$\Rightarrow 8x + 4 = 3x - 3 + 7$$

$$\Rightarrow 8x - 3x = -3 + 7 - 4$$

$$\Rightarrow 5x = 0$$

$$\Rightarrow x = 0$$

To check :

$$8x + 4 = 3(x - 1) + 7$$

$$\Rightarrow 0 + 4 = 3 \times (-1) + 7$$

$$\Rightarrow 4 = 4$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Hence, it is correct

7. $\Rightarrow 5x = 4(x + 10)$

$$\Rightarrow 5x = 4x + 40$$

$$\Rightarrow 5x - 4x = 40$$

$$\Rightarrow x = 40$$

To check :

$$\Rightarrow \frac{4}{5}x - \frac{3}{4}x = 4$$

$$\Rightarrow 40 = 40$$

$$\text{L.H.S.} = \text{R.H.S}$$

Hence, it is correct.



$$8. \quad \frac{2x}{3} - \frac{7x}{15} = 3 - 1$$

$$\Rightarrow \frac{10x - 7x}{15} = 2$$

$$\Rightarrow \frac{3x}{15} = 2$$

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

$$\Rightarrow x = 10$$

$$9. \quad 2y + y = \frac{26}{3} - \frac{5}{3}$$

$$\Rightarrow 3y = \frac{26 - 5}{3}$$

$$\Rightarrow y = \frac{21}{3 \times 3}$$

$$\Rightarrow y = \frac{7}{3}$$

$$10. \quad 3m - 5m = \frac{-8}{5}$$

$$\Rightarrow -2m = \frac{-8}{5}$$

$$\Rightarrow m = \frac{-8 \times 5}{-2}$$

$$\Rightarrow m = 20$$



Exercise – 2.4

1. Let Amina think a number x .

According to the question,

$$\left(x - \frac{5}{2}\right) \times 8 = 3x$$

$$\Rightarrow 8x - 20 = 3x$$

$$\Rightarrow 8x - 3x = 20$$

$$\Rightarrow 5x = 20$$

$$\Rightarrow x = 4$$

Hence, the number is 4.

2. Let another number be x .

Then positive number = $5x$

According to the question, $5x + 21 = 2(x + 21)$

$$\Rightarrow 5x + 21 = 2x + 42$$

$$\Rightarrow 3x = 21$$

$$\Rightarrow x = 7$$

Hence another number = 7 and positive number = $5 \times 7 = 35$

3. Let the unit place digit of a two-digit number be x .

Therefore, the tens place digit = $9 - x$.

\therefore 2-digit number = $10x$ tens place digit + unit place digit

\therefore Original number = $10(9 - x) + x$

According to the question, New number = Original number + 27

$$\Rightarrow 10x + (9 - x) = 10(9 - x) + x + 27$$

$$\Rightarrow 18x = 108$$

$$\Rightarrow x = 6$$

Hence, the 2-digit number

$$= 10(9 - x) + x = 10(9 - 6) + 6 = 10 \times 3 + 6 = 30 + 6 = 36$$

4. Let the unit place digit of a two-digit number be x .

Therefore, the tens place digit = $3x$

\therefore 2-digit number = $10 \times$ tens place digit + unit place digit

\therefore Original number = $(10 \times 3x) + x = 30x + x = 31x$

According to the question, New number + Original number = 88

$$\Rightarrow 10x + 3x + 31x = 88$$

$$\Rightarrow 44x = 88$$

$$\Rightarrow x = 2$$

Hence, the 2-digit number = $31x = 31 \times 2 = 62$

5. Let Shobo's present age be x years.

And Shobo's mother's present age = $6x$ years.

According to the question,

$$\Rightarrow x + 5 = \frac{1}{3}(6x)$$

$$\Rightarrow x = 5 \text{ years.}$$

Hence, Shobo's present age = 5 years.

And Shobo's mother's present age = $6 \times 5 = 30$ years

6. Let the length and breadth of the rectangular plot be $11x$ and $4x$ respectively.

$$\therefore \text{Perimeter of the plot} = \frac{75000}{100} = 750$$

We know that Perimeter of rectangle = $2(\text{length} + \text{breadth})$

Therefore, according to the question,

$$750 = 2(11x + 4x)$$

$$\Rightarrow 750 = 30x$$

$$\Rightarrow 30x = 750$$

$$\Rightarrow x = \frac{750}{30} = 25$$

Hence, length of rectangular plot = $11 \times 25 = 275\text{m}$

And breadth of rectangular plot = $4 \times 25 = 100\text{m}$

7. Let ratio between shirt material and trouser material be $3x : 2x$.

The cost of shirt material = $50 \times 3x = 150x$

$$\begin{aligned} \text{The selling price at 12\% gain} &= \frac{100 + P\%}{100} \times \text{C.P.} = \left(\frac{100 + 12}{100}\right) \times 150x \\ &= \frac{112}{100} \times 150x = 168x \end{aligned}$$

The cost of trouser material = $90 \times 2x = 180x$

$$\begin{aligned} \text{The selling price at 12\% gain} &= \frac{100 + P\%}{100} \times \text{C.P.} = \left(\frac{100 + 10}{100}\right) \times 180x \\ &= \frac{110}{100} \times 180x = 198x \end{aligned}$$

According to the question,

$$168x + 198x = 36,600 \Rightarrow 366x = 36600$$

$$x = \frac{36600}{366} = 100 \text{ meters}$$

Now, trouser material = $2x = 2 \times 100 = 200$ meters

Hence, Hasan bought 200 meters of the trouser material.

8. Let the total number of deer in the herd be x .

According to question,

$$x - \frac{x}{2} - \frac{3}{8}x = 9$$

$$\Rightarrow \frac{8x - 4x - 3x}{8} = 9$$

$$\Rightarrow x = 72$$

Hence, the total number of deer in the herd is 72.

9. Let present age of granddaughter be x years.

Therefore, Grandfather's age = $10x$ years

According to question,

$$10x = x + 54$$

$$\Rightarrow 10x - x = 54$$

$$\Rightarrow x = \frac{54}{9} = 6 \text{ years}$$

Hence, granddaughter's age = 6 years and grandfather's age = $10 \times 6 = 60$ years.

10. Let the present age of Aman's son be x years.

Therefore, Aman's age = $3x$ years

According to questions,

$$3x - 10 = 5(x - 10)$$

$$\Rightarrow 3x - 10 = 5x - 50$$

$$\Rightarrow 3x - 5x = -50 + 10$$

$$\Rightarrow -2x = -40$$

$$\Rightarrow x = \frac{-40}{-2} = 20 \text{ years}$$

Hence, Aman's son's age = 20 years

And Aman's age = $3 \times 2 = 60$ years

Exercise – 2.5

$$1. \quad \frac{x}{2} - \frac{1}{5} = \frac{x}{3} + \frac{1}{4}$$

$$\Rightarrow \frac{x}{2} - \frac{x}{3} = \frac{1}{4} + \frac{1}{5}$$

$$\Rightarrow \frac{3x - 2x}{6} = \frac{5 + 4}{20}$$

$$\Rightarrow \frac{x}{6} = \frac{9}{20}$$

$$\Rightarrow x = \frac{9 \times 6}{20} = \frac{27}{10}$$


To check :

$$\left[\frac{x}{2} - \frac{1}{5} = \frac{x}{3} + \frac{1}{4} \right]$$

$$\Rightarrow \frac{27}{10 \times 2} - \frac{1}{5} = \frac{27}{10 \times 3} + \frac{1}{4}$$

$$\Rightarrow \frac{27}{20} - \frac{1}{5} = \frac{9}{10} + \frac{1}{4}$$

$$\Rightarrow \frac{27 - 4}{20} = \frac{18 + 5}{20}$$

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$$\Rightarrow \frac{23}{20} = \frac{23}{20}$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Therefore, it is correct.

$$2. \quad \frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$$

$$\Rightarrow \frac{6n - 9n + 10n}{12} = 21$$

$$\Rightarrow \frac{7n}{12} = 21$$

$$\Rightarrow n = \frac{21 \times 12}{7}$$

$$\Rightarrow n = 36$$

To check :

$$\frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$$

$$\Rightarrow \frac{36}{2} - \frac{3 \times 36}{4} + \frac{5 \times 36}{6} = 21$$

$$\Rightarrow 18 - 27 + 30 = 21$$

$$\Rightarrow 21 = 21$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Therefore, it is correct.

$$3. \quad x + 7 - \frac{8x}{3} = \frac{17}{6} - \frac{5x}{2}$$

$$\Rightarrow \frac{x}{1} - \frac{8x}{3} + \frac{5x}{2} = \frac{17}{6} - \frac{7}{1}$$

$$\Rightarrow \frac{6x - 16x + 15x}{6} = \frac{17 - 42}{6}$$

$$\Rightarrow \frac{5x}{6} = \frac{-25}{6}$$

$$\Rightarrow x = \frac{-25 \times 6}{6 \times 5}$$

$$\Rightarrow x = -5$$

To Check :

$$x + 7 - \frac{8x}{3} = \frac{17}{6} - \frac{5x}{2}$$



$$\Rightarrow -5 + 7 - \frac{8 \times (-5)}{3} = \frac{17}{6} - \frac{5 \times (-5)}{2}$$

$$\Rightarrow 2 + \frac{40}{3} = \frac{17}{6} + \frac{25}{2}$$

$$\Rightarrow \frac{6 + 40}{3} = \frac{17 + 75}{6}$$

$$\Rightarrow \frac{46}{3} = \frac{92}{6}$$

$$\Rightarrow \frac{46}{3} = \frac{46}{3}$$

\Rightarrow L.H.S. = R.H.S.

Therefore, it is correct.

4. $\frac{x-5}{3} = \frac{x-3}{5}$

$$\Rightarrow 5 \times (x-5) = 3(x-3)$$

$$\Rightarrow 5x - 25 = 3x - 9$$

$$\Rightarrow x = \frac{16}{2} = 8$$

To check :

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

$$\Rightarrow \frac{8-5}{3} = \frac{8-3}{5}$$

$$\Rightarrow \frac{3}{3} = \frac{5}{5}$$

$$1 = 1$$

\Rightarrow L.H.S. = R.H.S.


Therefore, it is correct.

5. $\frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$

$$\Rightarrow \frac{3t-2}{4} - \frac{2t+3}{3} + t = \frac{2}{3}$$

$$\Rightarrow \frac{3(3t-2) - 4(2t+3) + 12t}{12} = \frac{2}{3}$$

$$\Rightarrow \frac{9t - 6 - 8t - 12 - 12t}{12} = \frac{2}{3}$$

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Linear Equations in One Variable

$$\Rightarrow \frac{13t-18}{12} = \frac{2}{3}$$

$$\Rightarrow 3 \times (13t-18) = 2 \times 12$$

$$\Rightarrow 39t - 54 = 24$$

$$\Rightarrow 39t = 24 + 54$$

$$\Rightarrow 39t = 78$$

$$\Rightarrow t = \frac{78}{39} = 2$$

To check :

$$\frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

$$\Rightarrow \frac{3 \times 2 - 2}{4} - \frac{2 \times 2 + 3}{3} = \frac{2}{3} - 2$$

$$\Rightarrow \frac{6-2}{4} - \frac{4+3}{3} = \frac{2-6}{3}$$

$$\Rightarrow \frac{4}{4} - \frac{7}{3} = \frac{-4}{3}$$

$$\Rightarrow \frac{1}{1} - \frac{7}{3} = \frac{-4}{3}$$

$$\Rightarrow \frac{3-7}{3} = \frac{-4}{3}$$

$$\Rightarrow \frac{-4}{3} = \frac{-4}{3}$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Therefore, it is correct.

6. $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$

$$\Rightarrow \frac{m}{1} - \frac{m-1}{2} + \frac{m-2}{3} = 1$$


$$\Rightarrow \frac{6m - 3(m-1) + 2(m-2)}{6} = 1$$

$$\Rightarrow \frac{6m - 3m + 3 + 2m - 4}{6} = 1$$

$$\Rightarrow \frac{5m-1}{6} = 1$$

$$\Rightarrow 5m - 1 = 6$$

$$\Rightarrow 5m = 6 + 1$$

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$$\Rightarrow 5m = 7$$

$$\Rightarrow m = \frac{7}{5}$$

To Check :

$$m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$$

$$\Rightarrow \frac{7}{5} - \frac{\frac{7}{5}-1}{2} = 1 - \frac{\frac{7}{5}-5}{3}$$

$$\Rightarrow \frac{7}{5} - \frac{\frac{7-5}{5}}{2} = 1 - \frac{\frac{7-10}{5}}{3}$$

$$\Rightarrow \frac{7}{5} - \frac{2}{5 \times 2} = 1 - \frac{-3}{5 \times 3}$$

$$\Rightarrow \frac{7}{5} - \frac{1}{5} = 1 + \frac{1}{5}$$

$$\Rightarrow \frac{7-1}{5} = \frac{5+1}{5}$$

$$\Rightarrow \frac{6}{5} = \frac{6}{5}$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Therefore, it is correct.

7. $3(t-3) = 5(2t+1)$

$$\Rightarrow 3t - 9 = 10t + 5$$

$$\Rightarrow 3t - 10t = 5 + 9$$

$$\Rightarrow -7t = 14$$

$$\Rightarrow t = \frac{14}{-7}$$

$$\Rightarrow t = -2$$

To Check :

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

$$\Rightarrow 3(-2-3) = 5\{2 \times (-2) + 1\}$$


$$\Rightarrow 3 \times -5 = 5(-4+1)$$

$$\Rightarrow -15 = 5 \times (-3)$$

$$\Rightarrow -15 = -15$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Therefore, it is correct.

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Linear Equations in One Variable

$$\begin{aligned}8. \quad & 15(y - 4) - 2(y - 9) + 5(y + 6) = 0 \\ & \Rightarrow 15y - 60 - 2y + 18 + 5y + 30 = 0 \\ & \Rightarrow 18y - 12 = 0 \\ & \Rightarrow 18y = 12 \\ & \Rightarrow y = \frac{12}{18} \\ & \Rightarrow y = \frac{2}{3}\end{aligned}$$

To Check :

$$\begin{aligned}& 15(y - 4) - 2(y - 9) + 5(y + 6) = 0 \\ & \Rightarrow 15\left(\frac{2}{3} - 4\right) - 2\left(\frac{2}{3} - 9\right) + 5\left(\frac{2}{3} + 5\right) = 0 \\ & \Rightarrow 15\left(\frac{2-12}{3}\right) - 2\left(\frac{2-27}{3}\right) + 5\left(\frac{2+18}{3}\right) = 0 \\ & \Rightarrow 15 \times \frac{-10}{3} - 2 \times \frac{-25}{3} + 5 \times \frac{20}{3} = 0 \\ & \Rightarrow -50 + \frac{50}{3} + \frac{100}{3} = 0 \\ & \Rightarrow -50 + \frac{50+100}{3} = 0 \\ & \Rightarrow -50 + \frac{150}{3} = 0 \\ & \Rightarrow -50 + 50 = 0 \\ & \Rightarrow 0 = 0 \\ & \Rightarrow \text{L.H.S.} = \text{R.H.S.}\end{aligned}$$

Therefore, it is correct.

$$\begin{aligned}9. \quad & 3(5z - 7) - 2(9z - 11) = 4(8z - 13) - 17 \\ & \Rightarrow 15z - 21 - 18z + 22 = 32z - 52 - 17 \\ & \Rightarrow -3z + 1 = 32z - 69 \\ & \Rightarrow -3z - 32z = -69 - 1 \\ & \Rightarrow -35z = -70 \\ & \Rightarrow z = \frac{-70}{-35} = 2\end{aligned}$$

To check :

$$\begin{aligned}& 3(5z - 7) - 2(9z - 11) = 4(8z - 13) - 17 \\ & \Rightarrow 3(5 \times 2 - 7) - 2(9 \times 2 - 11) = 4(8 \times 2 - 13) - 17 \\ & \Rightarrow 3(10 - 7) - 2(18 - 11) = 4(16 - 13) - 17\end{aligned}$$

$$\Rightarrow 3 \times 3 - 2 \times 7 - 17$$

$$\Rightarrow 9 - 14 = 12 - 17$$

$$\Rightarrow -5 = -5$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Therefore, it is correct.

$$10. \quad 0.25(4f-3) = 0.05(10f-9)$$

$$\Rightarrow 1.00f - 0.75 = 0.50f - 0.45$$

$$\Rightarrow 1.00f - 0.50f = -0.45 + 0.75$$

$$\Rightarrow 0.50f = 0.3$$

$$\Rightarrow f = \frac{0.3}{0.50}$$

$$\Rightarrow f = 0.6$$

To check :

$$0.25(4f-3) = 0.05(10f-9)$$

$$\Rightarrow 0.25(4 \times 0.6 - 3) = 0.05(10 \times 0.6 - 9)$$

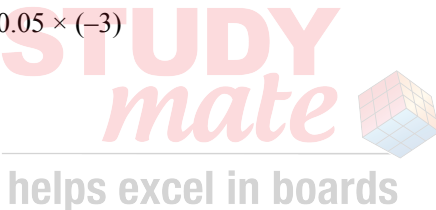
$$\Rightarrow 0.25(2.4 - 3) = 0.05(6.0 - 9)$$

$$\Rightarrow 0.25 \times (-0.6) = 0.05 \times (-3)$$

$$\Rightarrow -0.150 = -0.150$$

$$\Rightarrow \text{L.H.S.} = \text{R.H.S.}$$

Therefore, it is correct.



Exercise – 2.6

$$1. \quad \frac{8x-3}{3x} = 2$$

$$\Rightarrow 8x - 3 = 2 \times 3x$$

$$\Rightarrow 8x - 3 = 6x$$

$$\Rightarrow 8x - 6x = 3$$

$$\Rightarrow 2x = 3$$

$$\Rightarrow x = \frac{3}{2}$$

$$2. \quad \frac{9x}{7-6x} = 15$$

$$\Rightarrow 9x = 15(7 - 6x)$$

$$\Rightarrow 9x = 105 - 90x$$

$$\Rightarrow 9x + 90x = 105$$

$$\Rightarrow 99x = 105$$

$$\Rightarrow x = \frac{105}{99}$$

$$\Rightarrow x = \frac{35}{33}$$

$$3. \frac{z}{z+15} = \frac{4}{9}$$

$$\Rightarrow z \times 9 = 4(z + 15)$$

$$\Rightarrow 9z = 4z + 60$$

$$\Rightarrow 9z - 4z = 60$$

$$\Rightarrow 5z = 60$$

$$\Rightarrow z = \frac{60}{5}$$

$$\Rightarrow z = 12$$

$$4. \frac{3y+4}{2-6y} = \frac{-2}{5}$$

$$\Rightarrow 5(3y + 4) = -2(2 - 6y)$$

$$\Rightarrow 15y + 20 = -4 + 12y$$

$$\Rightarrow 15y - 12y = -4 - 20$$

$$\Rightarrow 3y = -24$$

$$\Rightarrow y = \frac{-24}{3}$$

$$\Rightarrow y = -8$$

$$5. \frac{7y+4}{y+2} = \frac{-4}{3}$$

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

$$\Rightarrow 21y + 12 = -y - 2$$

$$\Rightarrow 21y + y = -2 - 12$$

$$\Rightarrow 22y = -14$$

$$\Rightarrow y = \frac{-14}{22}$$

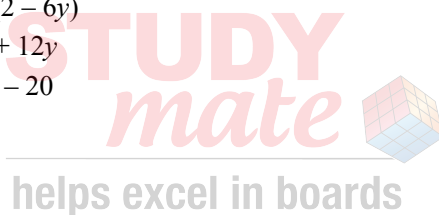
$$\Rightarrow y = \frac{-7}{11}$$

6. Let the Ages of Hari and Harry be $5x$ years and $7x$ years

According to question, $\frac{5x+4}{7x+4} = \frac{3}{4}$

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

$$\Rightarrow 20x + 16 = 21x + 12$$



$$\Rightarrow 20x - 21x = 12 - 16$$

$$\Rightarrow -x = -4$$

$$\Rightarrow x = 4$$

Hence, the age of Hari = $5x = 5 \times 4 = 20$ years

And the age of Harry = $7x = 7 \times 4 = 28$ years.

7. Let the numerator of a rational number be x , then the denominator is $x + 8$.

Therefore, Rational number = $\frac{x}{x+8}$

According to the questions, $\frac{x+17}{x+8-1} = \frac{3}{2}$

$$\Rightarrow \frac{x+17}{x+7} = \frac{3}{2}$$


$$\Rightarrow 2(x+17) = 3(x+7)$$

$$\Rightarrow 2x + 34 = 3x + 21$$

$$\Rightarrow 2x - 3x = 21 - 34$$

$$\Rightarrow -x = -13$$

$$\Rightarrow x = 13$$

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