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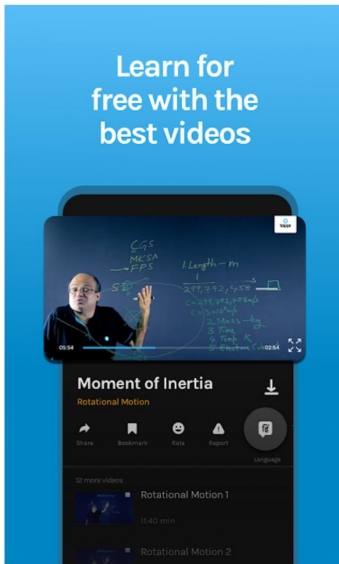
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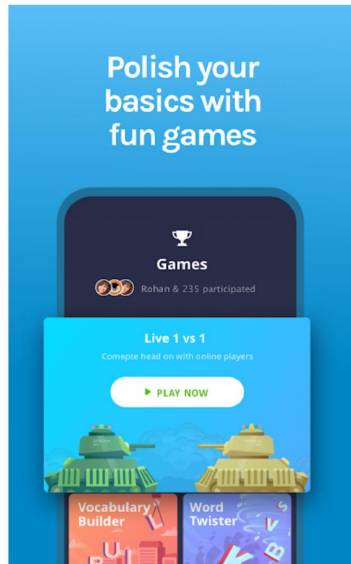


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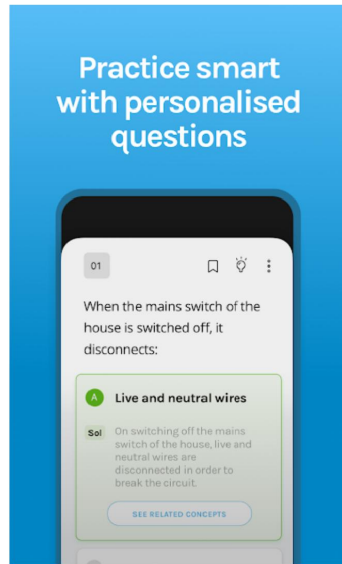
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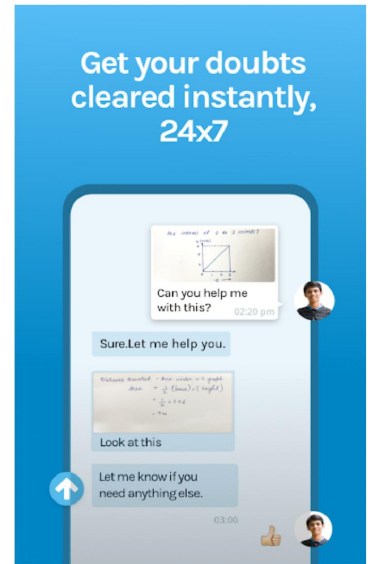
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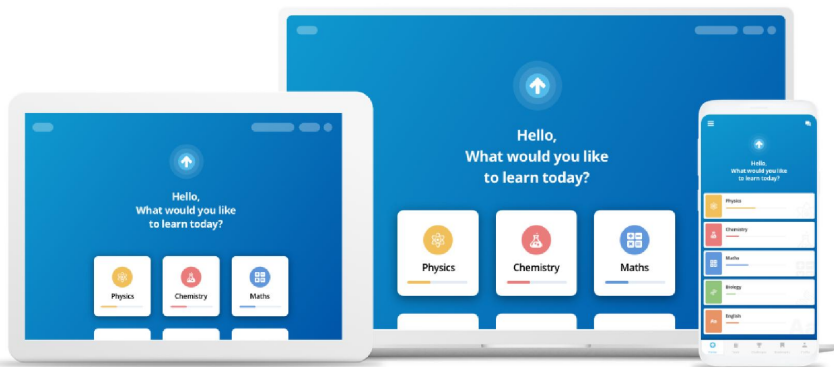
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#463518

Topic: Solving Linear Equations in One Variable

Solve the equation:

$$x - 2 = 7$$

Solution

Transporting 2 to RHS, we obtain

$$x = 7 + 2$$

$$x = 9$$

#463519

Topic: Solving Linear Equations in One Variable

Solve the equation:

$$y + 3 = 10$$

Solution

Transporting 3 to RHS, we obtain

$$y = 10 - 3 = 7$$

$$\therefore y = 7$$

#463520

Topic: Solving Linear Equations in One Variable

Solve the equation:

$$6 = z + 2$$

Solution

Transporting 2 to LHS, we obtain

$$6 - 2 = z$$

$$z = 4$$

#463522

Topic: Solving Linear Equations in One Variable

Solve the equation:

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

Solution

Transporting $\frac{3}{7}$ to RHS, we will get,

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

$$x = \frac{14}{7}$$

$$x = 2$$

#463524

Topic: Solving Linear Equations in One Variable

Solve the equation:

$$6x = 12$$

Solution

Given, $6x = 12$

Divide both sides by 6,

$$\text{We will get } \frac{6x}{6} = \frac{12}{6}$$

$$x = 2$$

#463525

Topic: Solving Linear Equations in One Variable

Solve the equation:

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

Solution

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

Multiply both sides by 5, we will get,

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

$$t = 50$$

#463527

Topic: Solving Linear Equations in One Variable

Solve the equation:

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

Solution

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

Multiply both sides by $\frac{3}{2}$, we will get

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

$$x = 27$$

#463528

Topic: Solving Linear Equations in One Variable

Solve the equation:

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

Solution

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

Multiply both sides by 1.5, we will get

$$1.6 \times 1.5 = \frac{y}{1.5} \times 1.5$$

$$y = 2.4$$

#463529

Topic: Solving Linear Equations in One Variable

Solve the equation:

$$7x - 9 = 16$$

Solution

Transport 9 to RHS, we will get

$$7x = 9 + 16$$

$$7x = 25$$

Now, divide both sides by 7, we will get

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

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

#463530

Topic: Solving Linear Equations in One Variable

Solve the equation:

$$14y - 8 = 13$$

Solution

Transport 8 to RHS

$$14y = 13 + 8$$

$$14y = 21$$

Divide both sides by 14, we will get,

$$\frac{14y}{14} = \frac{21}{14}$$

$$y = \frac{3}{2}$$

#463532

Topic: Solving Linear Equations in One Variable

Solve the equation:

$$17 + 6p = 9$$

Solution

Given, $17 + 6p = 9$

Transport 17 to RHS, $6p = 9 - 17$

$$6p = -8$$

Divide both sides by 6

We will get, $\frac{6p}{6} = \frac{-8}{6}$

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

#463533

Topic: Solving Linear Equations in One Variable

Solve the equation:

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

Solution

Transport 1 to RHS

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

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

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

Multiply both sides by 3, we will get,

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

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

#463536

Topic: Solving Linear Equations in One Variable

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?

Solution

Let the number : x

As per the question's

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

Multiply both sides by 2,

$$x - \frac{1}{2} = \frac{1}{4}, \text{ transport } \frac{1}{2} \text{ to RHS}$$

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

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

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

#463538

Topic: Solving Linear Equations in One Variable

The perimeter of a rectangular swimming pool is 154 m . Its length is 2 m more than twice its breadth. What are the length and the breadth of the pool?

Solution

Let the breadth be b m

The length will be $(2b + 2)m$

Perimeter of swimming pool = $2(l + b) = 154$ m

$$2(2b + 2 + b) = 154$$

$$2(3b + 2) = 154$$

Dividing both sides by 2, we will get,

$$3b + 2 = 77$$

Transport 2 to RHS

$$2b = 75$$

Divide both sides by 3

$$b = 25$$
 m

$$l = 2b + 2 = 2 \times 25 + 2 = 52$$
 m

#463540

Topic: Solving Linear Equations in One Variable

The base of an isosceles triangle is $\frac{4}{3}$ cm. The perimeter of the triangle is $\frac{62}{15}$ cm. What is the length of either of remaining equal sides?

Solution

Let the length of equal sides be x cm.

Perimeter = $x + x +$ third side

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

Transport $\frac{4}{3}$ to RHS

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

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

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

Divide sides by 2,

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

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

#463541

Topic: Solving Linear Equations in One Variable

Sum of two numbers is 95. If one exceeds the other number 15, find the numbers

Solution

Let one number = x ,

\therefore The other will be: $x + 15$

As per the question:

$$x + x + 15 = 95, 2x = 80$$

$$x = 40$$

One number $\Rightarrow 40$

Other number will be: $x + 15 \Rightarrow 40 + 15$

$$= 55$$

#463543

Topic: Solving Linear Equations in One Variable

Two numbers are in the ratio 5:3. If they differ by 18, what are the numbers?

Solution

Let x be common ratio

\therefore numbers will be $5x$ and $3x$ respectively.

Difference between these numbers $\Rightarrow 18$

$$5x - 3x = 18$$

$$2x = 18$$

Divide both sides by 2.

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

$$x = 9$$

\therefore First number = $5x = 5 \times 9 = 45$

Second number = $3x = 3 \times 9 = 27$

#463545

Topic: Solving Linear Equations in One Variable

Three consecutive integers add up to 51. What are these integers

Solution

Let 3 consecutive integers be $x, x + 1, x + 2$

Sum of 3 numbers = $x + x + 1 + x + 2$

$$= 3x + 3$$

$$3x + 3 = 51,$$

Transport 3 to RHS

$$3x = 48$$

Divide both sides by 3

$$\frac{3x}{3} = \frac{48}{3}$$

$$\Rightarrow x = 16$$

$$\Rightarrow x = 16 + 1 = 17$$

$$\Rightarrow x = 16 + 2 = 18$$

Integers are 16, 17, 18

#463547

Topic: Solving Linear Equations in One Variable

The sum of 3 consecutive multiples of 8 is 888. Find the multiples

Solution

Let 3 consecutive multiple of 8

$$8x, 8(x+1), 8(x+2)$$

$$\text{Sum} = 8x + 8(x+1) + 8(x+2) = 888$$

$$8(x+x+1+2) = 888$$

$$3(x+1) = 111$$

$$x+1 = \frac{111}{3}$$

$$x+1 = 37$$

$$x = 36$$

$$\text{First multiple} = 8x = 8 \times 36 = 288$$

$$\text{Second} = 8(x+1) = 8 \times 37 = 296$$

$$\text{Third} = 8(x+2) = 8 \times 38 = 304$$

#463549

Topic: Solving Linear Equations in One Variable

Three consecutive integers are such that when they are taken in increasing order and multiplied by 2, 3 and 4 respectively, they add upto 74. Find these numbers.

Solution

Let 3 consecutive integers: $x, x+1, x+2$

$$\text{As per the question: } 2x + 3(x+1) + 4(x+2) = 74$$

$$9x + 11 = 74$$

Transpose 11 to RHS

$$9x = 63$$

Divide both sides by 9

$$x = \frac{63}{9}, x = 7$$

$$x = 7,$$

$$x+1 = 7+1 = 8$$

$$x+2 = 7+2 = 9$$

Numbers are 7, 8 and 9

#463554

Topic: Solving Linear Equations in One Variable

The ages of Rahul and Haroon are in ratio 5 : 7. Four years later the sum of their ages will be 56 years. What are their present age?

Solution

Let Rahul's and Haroon's age's common ration be x .

\therefore Age of Rahul and Haroon will be $5x$ and $7x$ years

After, 4 years, Age of Rahul and Haroon will be $(5x+4)$ and $(7x+4)$ years respectively.

Now, As per the question

After 4 years, Sum of age of Rahul and Haroon is 56 yrs

$$\therefore (5x+4 + 7x+4) = 56$$

$$12x + 8 = 56$$

Transpose 8 to RHS

$$12x = 48$$

Divide both sides by 12,

$$\therefore x = 4$$

Rahul's age $5x = 5 \times 4 = 20$ years

Haroon's age $7x = 7 \times 4 = 28$ years

#463558**Topic:** Solving Linear Equations in One Variable

The number of boys and girls in a class are in ratio 7 : 5. The number of boys is 8 more than the number of girls. What is the total class strength?

Solution

Let the common ratio between number of boys and girls be x

Number of boys = $7x$

Number of girls = $5x$

As per the question,

Number of boys = Number of girls + 8

$$7x = 5x + 8$$

Transpose $5x$ to LHS, we will get

$$7x - 5x = 8$$

$$2x = 8$$

Divide both sides by 2

$$x = 4$$

$$\text{No. of boys} = 7x = 7 \times 4 = 28$$

$$\text{No. of girls} = 5x = 5 \times 4 = 20$$

$$\text{Total class students} = 28 + 20 = 48$$

#463560**Topic:** Solving Linear Equations in One Variable

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 of each one of them?

Solution

Let age of Baichung's father age be x years

\therefore Baichung's age and his grandfather's age $\Rightarrow (x - 29)$ and $(x + 26)$ yrs respectively.

As per the question, Sum of ages of 3 people = 135 years

$$\therefore x + x - 29 + x + 26 = 135$$

$$3x - 3 = 135$$

Transpose 3 to RHS, we will get,

$$3x = 138$$

Divides both sides by 3, we will get

$$x = \frac{138}{3}$$

$$\Rightarrow x = 46$$

$$\text{Baichung's father age} = x = 46 \text{ years}$$

$$\text{Baichung's age} = x - 29 = 46 - 29 = 17 \text{ years}$$

$$\text{Baichung's grandfather's age} = x + 26 = 46 + 26 = 72 \text{ years}$$

#463564**Topic:** Solving Linear Equations in One Variable

Fifteen years from now Ravi's age will be four times his present age. What is Ravi's present age?

Solution

Let Ravi's present age : x

Fifteen years later, Ravi's age = $4 \times x$

$$x + 15 = 4x$$

$$15 = 4x - x$$

$$3x = 15$$

$$\therefore x = 5$$

Ravi's present age 5 years

#463565

Topic: Solving Linear Equations in One Variable

A rational number's 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?

Solution

Let the number be x

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

Transpose $\frac{2}{3}$ to RHS

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

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

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

$$\text{Rational number} = -\frac{1}{2}$$

#463568

Topic: Solving Linear Equations in One Variable

Lakshmi is a cashier in a bank. She has currency notes of denominations Rs. 100, Rs. 50 and Rs. 10 respectively. The ratio of 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?

Solution

Let the number of notes of different denomination be x .

\therefore Numbers of Rs100 notes, 50 notes and Rs10 notes will be $2x$, $3x$ and $5x$ respectively.

$$\text{Amount of 100 Rs notes} \Rightarrow \text{Rs}100 \times 2x = 200x$$

$$\text{Amount of 50 Rs notes} \Rightarrow \text{Rs}50 \times 3x = 150x$$

$$\text{Amount of 10 Rs notes} \Rightarrow \text{Rs}10 \times 5x = 50x$$

As per the question

$$\text{Total amount} = 400000$$

$$200x + 150x + 50x = 400000$$

$$400x = 400000, x = 1000$$

$$\text{No of Rs 100 notes} = 2x = 2 \times 1000 = 2000$$

$$\text{No of Rs 50 notes} = 3x = 3 \times 1000 = 3000$$

$$\text{No of Rs 10 notes} = 5x = 5 \times 1000 = 5000$$

#463570

Topic: Solving Linear Equations in One Variable

I have a total of Rs 300 in coins of denomination Re1, Rs2 and Rs5. The number of Rs2 coins is 3 times the number of Rs5 coins. The total number of coins is 160. How many coins of each denomination are with me

Solution

Let number of Rs5 coins be x

Number of Rs 2 coins = $3 \times$ Number of 5 Rs coins = $3x$

Number of Re1 coins = $160 - (x + 3x)$

$$= 160 - 4x$$

Amount of Rs5 coins = $5 \times x = 5x$

Amount of Rs2 coins = $2 \times 3x = Rs6x$

Amount of Re1 coins = $(160 - 4 \times x)$

$$= 160 - 4x$$

As per the question, Total amount = Rs300

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

$$7x = 300 - 160$$

$$x = \frac{140}{7}$$

$$x = 20$$

Number of Re 1 coins = $160 - 4x$

$$= 160 - 4 \times 20$$

$$= 80$$

Number of Rs2 coins = $3x = 3 \times 20 = 60$

Number of Rs5 coins = $x = 20$

#463572

Topic: Solving Linear Equations in One Variable

The organisers of an essay competition decide that winner is the competition gets a prize of Rs 100 and a participation who does not win gets a prize of Rs25. The total prize money distributed is Rs3000. Find number of winners, if total number of participants is 63.

Solution

Let the number of winners : x

$$\therefore \text{Then number of non winners or those who did not win} \Rightarrow 63 - x$$

The money given to winners $\Rightarrow Rs100x$ and money given to participants who didn't win = $Rs25(63 - x)$

As per the question:

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

Transpose 1575 to RHS

$$75x = 1425$$

Now divide both sides by 75,

$$\text{We will get } x = \frac{1425}{75}$$

$$\Rightarrow x = 19$$

#463591

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

$$3x = 2x + 18$$

Solution

Transpose $2x$ to LHS,

$$3x - 2x = 18$$

$$x = 18$$

$$\text{LHS} \Rightarrow 3x = 3 \times 18 = 54$$

$$\text{RHS} \Rightarrow 2x + 18 = 2 \times 18 + 18 = 36 + 18 = 54$$

$$\text{LHS} = \text{RHS}$$

#463592

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

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

Solution

Transpose 3 to RHS and $3t$ to LHS

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

$$2t = -2$$

On dividing both sides by 2, we get

$$t = -1$$

$$\text{LHS} = 5t - 3 = 5 \times (-1) - 3 = -5 - 3 = -8$$

$$\text{RHS} = 3t - 5 = 3 \times (-1) - 5 = -3 - 5 = -8$$

$$\text{LHS} = \text{RHS}$$

Hence proved

#463602

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

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

Solution

Transpose $3x$ to LHS and 9 to RHS

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

$$2x = -4$$

$$x = -2$$

$$\text{LHS} \Rightarrow 5x + 9 \Rightarrow 5(-2) + 9 = -10 + 9 = -1$$

$$\text{RHS} \Rightarrow 5 + 3x = 5 + 3(-2) = 5 - 6 = -1$$

$$\text{LHS} = \text{RHS}$$

Hence proved

#463604

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

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

Solution

Transpose $2z$ to LHS and 3 to RHS

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

$$2z = 3$$

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

$$\text{LHS} \Rightarrow 4z + 3 = 4 \times \frac{3}{2} + 3 = 9$$

$$\text{RHS} \Rightarrow 6 + 2z = 6 + 2 \times \frac{3}{2} \Rightarrow 6 + 3 = 9$$

LHS = RHS

Hence proved

#463606

Topic: Linear Equations in One Variable

The taxi fare in a city is as follows: For the first kilometre, the fare is 8 and for the subsequent distance it is 5 per km. Taking the distance covered as x km and total fare as Rs. y , write a linear equation for this information and draw its graph.

Solution

x	0	1	2
y	3	8	13

Taxi fare for first kilometer = Rs. 8

Taxi fare for subsequent distance = Rs. 5

Total distance covered = x

Total fare = y

Since the fare for first kilometer = Rs.8

According to problem,

Fare for $(x-1)$ kilometer = $5(x-1)$

So, the total fare $y = 5(x-1) + 8$

$$\Rightarrow y = 5(x-1) + 8$$

$$\Rightarrow y = 5x - 5 + 8$$

$$\Rightarrow y = 5x + 3$$

Hence, $y = 5x + 3$ is the required linear equation.

Now the equation is

$$y = 5x + 3 \dots(1)$$

Now, putting the value $x = 0$ in (1)

$$y = 5 \times 0 + 3$$

$$y = 0 + 3 = 3 \text{ So the solution is } (0, 3)$$

Putting the value $x = 1$ in (1)

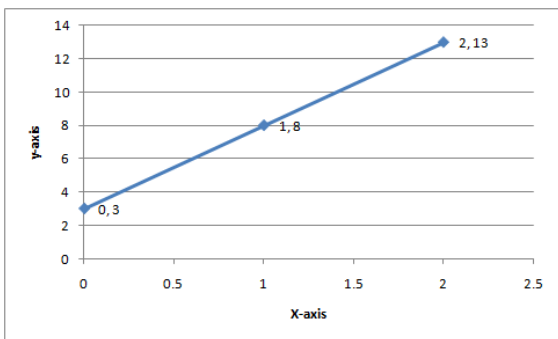
$$y = 5 \times 1 + 3$$

$$y = 5 + 3 = 8. \text{ So the solution is } (1, 8)$$

Putting the value $x = 2$ in (1)

$$y = 5 \times 2 + 3$$

$$y = 10 + 3 = 13. \text{ So the solution is } (2, 13)$$



#463608

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

$$2x - 1 = 14 - x$$

Solution

Transpose -1 to RHS and $-x$ to LHS

$$2x + x = 14 + 1$$

$$3x = 15$$

Divide both sides by 3

We will get,

$$x = 5$$

$$\text{LHS} \Rightarrow 2x - 1 = 2 \times 5 - 1 = 10 - 1 = 9$$

$$\text{RHS} \Rightarrow 14 - x = 14 - 5 = 9$$

$$\text{LHS} = \text{RH}$$

Hence proved

#463610

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

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

Solution

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

$$8x + 4 = 3x + 4$$

$$8x = 3x$$

$$5x = 0$$

$$x = 0$$

$$\text{LHS} \Rightarrow 8x + 4 = 8 \times 0 + 4 = 4$$

$$\text{RHS} \Rightarrow 3(x - 1) + 7 = 3(0 - 1) + 7 = -3 + 7 = 4$$

$$\text{LHS} = \text{RHS}$$

Hence proved

#463612

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

$$x = \frac{4}{5}(x + 10)$$

Solution

$$x = \frac{4}{5}(x + 10)$$

Multiply both sides by 5,

$$5x = 4(x + 10)$$

$$5x = 4x + 40$$

Transpose $4x$ to LHS

$$5x - 4x = 40$$

$$x = 40$$

$$\text{LHS} \Rightarrow x = 40$$

$$\text{RHS} \Rightarrow \frac{4}{5}(x + 10) = \frac{4}{5}(40 + 10) = \frac{4}{5} \times 50 = 40$$

$$\text{LHS} = \text{RHS}$$

Hence proved

#463613

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

$$\frac{2x}{3} + 1 = \frac{7x}{15} + 3$$

Solution

Transpose $\frac{7x}{15}$ to LHS and 1 to RHS

$$\frac{2x}{3} - \frac{7x}{15} = 3 - 1 \Rightarrow \frac{10x - 7x}{15} = 2$$

$$\frac{3x}{15} = 2 \Rightarrow \frac{x}{5} = 2$$

Multiply both sides by 5,

$$x = 10$$

$$\text{LHS} \Rightarrow \frac{2x}{3} + 1 = \frac{2}{3} \times 10 + 1 = \frac{23}{3}$$

$$\text{RHS} \Rightarrow \frac{7x}{15} + 3 = \frac{7}{15} \times 10 + 3 = \frac{14}{3} + 3 = \frac{14 + 9}{3} = \frac{23}{3}$$

$$\text{LHS} = \text{RHS}$$

Hence proved

#463615

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

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

Solution

Transpose $\frac{5}{3}$ to RHS and y to LHS

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

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

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

$$\Rightarrow 3y = 7$$

Divide both sides by 3

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

$$\text{LHS} \Rightarrow 2y + \frac{5}{3} = \frac{2 \times 7}{3} + \frac{5}{3} = \frac{14}{3} + \frac{5}{3} = \frac{19}{3}$$

$$\text{RHS} \Rightarrow \frac{26}{3} - y = \frac{26}{3} - \frac{7}{3} = \frac{26 - 7}{3} = \frac{19}{3}$$

$$\text{LHS} = \text{RHS}$$

Hence proved.

#463619

Topic: Solving Linear Equations in One Variable

Solve the following equation and check your results:

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

Solution

Transpose $5m$ to LHS,

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

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

Multiply both sides by 5

$$2m \times 5 = 8$$

$$\Rightarrow m = \frac{4}{5}$$

$$\text{LHS} = 3m = 3 \times \frac{4}{5} = \frac{12}{5}$$

$$\text{RHS} = 5m - \frac{8}{5} \Rightarrow (5 \times \frac{4}{5}) - \frac{8}{5} = \frac{20 - 8}{5} = \frac{12}{5}$$

LHS = RHS

Hence proved

#463620

Topic: Linear Equations in One Variable

Give the geometric representations of $2x + 9 = 0$ as an equation

(i) in one variable

(ii) in two variable

Solution

(i) In one variable

Given equation is $2x + 9 = 0$

$$\Rightarrow 2x = -9$$

$$\Rightarrow x = \frac{-9}{2} = -4.5$$

(ii) Given equation is $2x + 9 = 0$

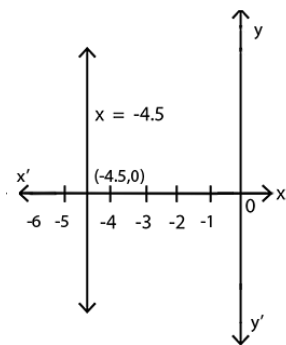
$$\Rightarrow 2x + 0y + 9 = 0$$

$$\Rightarrow 2x = -9$$

$$\Rightarrow x = \frac{-9}{2} = -4.5$$

It is line parallel to y -axis at a negative distance.

Two points lying it are the points $A(-4.5, 0)$, $B(-4.5, 2)$.



#463621

Topic: Solving Linear Equations in One Variable

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?

Solution

Let the number be x

As per the question

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

$$8x - 20 = 3x$$

$$8x - 3x = 20$$

$$5x = 20$$

$$x = 4$$

Number is 4.

#463622

Topic: Solving Linear Equations in One Variable

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?

Solution

Let the numbers be x and $5x$, As per the question

$$21 + 5x = 2(x + 21)$$

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

$$5x - 2x = 42 - 21$$

$$3x = 21$$

$$x = 7$$

\therefore Numbers are $x = 7$ and $5x = 7 \times 5 = 35$

#463623

Topic: Solving Linear Equations in One Variable

Sum of the digits of a two digit number is 9. When we interchange the digit it is found that the resulting new number is greater than the original number by 27. What is the two digit number

Solution

Let the digits at tens place and ones place: x and $9 - x$ respectively.

$$\therefore \text{original number} = 10x + (9 - x)$$

$$= 9x + 9$$

Now Interchange the digits: Digit at ones place and tens place: x and $9 - x$ respectively.

$$\therefore \text{New number: } 10(9 - x) + x$$

$$= 90 - 10x + x$$

$$= 90 - 9x$$

AS per the question

$$\text{New number} = \text{Original number} + 27$$

$$90 - 9x = 9x + 9 + 27$$

$$90 - 9x = 9x + 36$$

$$18x = 54$$

$$x = \frac{54}{18}$$

$$x = 3$$

Digit at tens place $\Rightarrow 3$ and one's place : 6

$$\therefore \text{Two digit number: } 36$$

#463626

Topic: Solving Linear Equations in One Variable

One of the two digits of a two digit number is three times the other digit. If you interchange the digit of this two digit number and add the resulting number to the original number, you get 88. What is the original number

Solution

Let the digits at tens place: x and ones place: $3x$

$$\therefore \text{original number} = 10x + 3x$$

$$= 13x$$

Interchange the digits,

Digits at ones place and tens place will be x and $3x$

$$\text{Numbers: } 10 \times 3x + x = 30x + x = 31x$$

As per the questions

$$\text{Original number} + \text{New number} = 88$$

$$13x + 31x = 88$$

$$44x = 88$$

$$x = 2$$

$$\text{Original number} = 13x = 13 \times 2 = 26$$

Or interchanging them, we will get 62

#463631

Topic: Solving Linear Equations in One Variable

Shobo's mother's present age is 6 times shobo's present age. Shobo's age five years from now will be one third of this mother's present age. What are their present ages?

Solution

Let Shobo's age be x years.

\therefore His mother's age will be: $6x$ years

After 5 years, Shobo's age = $\frac{\text{shobo's mother's present age}}{3}$

As per the question, the equation

$$x + 5 = \frac{6x}{3}$$

$$x + 5 = 2x$$

$$x = 5$$

Present age of shobo: 5 years

Shobo's mother age: $6x = 6 \times 5 = 30$ years

#463635

Topic: Solving Linear Equations in One Variable

There is a narrow rectangular plot, reserved for a school, in mahuli village. The length and breadth of plot are in ratio 11:4. At the rate Rs100 per metre will cost the village panchayat Rs75,000 to fence the plot. What are dimensions of plot

Solution

Let the length and breadth's common ratio: x in metre

\therefore Length : $11x$ and Breadth : $4x$

Perimeter $\Rightarrow 2(l + b)$

$$= 2(11x + 4x) = 30x$$

As per the question:

Cost of fencing plot at rate of Rs. 100 per meter is Rs. 75000

$$\therefore 100 \times \text{Perimeter} = 75000$$

$$3000x = 75000$$

$$x = 25$$

$$\text{Length} = 11 \times x = 11 \times 25 = 275 \text{ m}$$

$$\text{Breadth} = 4x = 4 \times 25 = 100 \text{ m}$$

#463636

Topic: Solving Linear Equations in One Variable

Hasan buys 2 kinds of cloth material for school uniform, shirt material that costs him Rs. 50 per metre and trouser material that costs him 90 per metre. For every 2 metres of trouser material he buys 3 metres of shirt material. He sells the material at 12% and 10% profit respectively. His total sale is Rs. 36660. How much trouser material did he buy

Solution

Let $2m$ of trouser material and $3m$ of shirt material be bought by Hasan.

\therefore Selling price of trouser material/ metre

$$= \text{Rs. } 90 + \frac{90 \times 12}{100}$$

$$= 90 + 10.8$$

$$= \text{Rs. } 100.80$$

$$\text{Selling price of shirt material per metre} = \text{Rs. } \left(50 + \frac{50 \times 10}{100} \right) = 50 + 5$$

$$= \text{Rs. } 55$$

\therefore Total amount of selling = 36660

$$100.8 \times 2x + 55 \times 3x = 36660$$

$$366.60x = 36660$$

$$x = 100$$

$$\text{Trouser material} = 2x = 2 \times 100m$$

$$= 200 \text{ m}$$

#463640

Topic: Solving Linear Equations in One Variable

Half of a herd of deer are grazing in the field and three fourth of remaining are playing nearby. The rest 9 are drinking water from pond. Find number of deer in the herd

SolutionLet number of deer be x No. of deer grazing: $\frac{x}{2}$ No. of deer playing nearby = $\frac{3}{4}$ No. of remaining deer

$$= \frac{3}{4} \left(x - \frac{x}{2} \right)$$

$$= \frac{3}{4} \times \frac{x}{2} = \frac{3x}{8}$$

No. of deer drinking water from pond = 9

$$x - \left(\frac{x}{2} + \frac{3x}{8} \right) = 9$$

$$x - \left(\frac{4x + 3x}{8} \right) = 9$$

$$x - \frac{7x}{8} = 9$$

$$\frac{x}{8} = 9$$

$$x = 72$$

Total no. of deer = 72

#463641

Topic: Solving Linear Equations in One Variable

A grandfather is 10 times older than his granddaughter. He is also 54 years older than her. Find their present ages

SolutionLet grand daughter's age: x \therefore Grandfather's age: $10x$

As per the questions

Grandfather's age = Grand daughter's age + 54

$$10x = x + 54$$

$$9x = 54$$

$$x = 6$$

Grand daughter's age = 6 years

#463646

Topic: Solving Linear Equations in One Variable

Aman's age is 3 times his son's age. Ten years ago he was five times his son's age. Find their present ages

Solution

Let Aman's son age: x

\therefore Aman's age will be $3x$

Ten years ago, their ages was $(x - 10)$ and $(3x - 10)$ respectively

As per the question's

10 years ago, Aman's age = 5 (Aman's son's age 10 yrs age)

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

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

$$2x = 40$$

$$x = 20$$

Aman's son's age = $x = 20$ years and Aman's age = $3x = 3 \times 20 = 60$ years

#463650

Topic: Solving Linear Equations in One Variable

Solve linear equation:

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

Solution

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

Transpose $\frac{x}{3}$ to LHS and $\frac{1}{5}$ to RHS

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

$$\text{LHS} \Rightarrow x - \frac{x}{3} \Rightarrow \text{LCM} \Rightarrow 3$$

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

$$\text{RHS} \Rightarrow \frac{1}{4} + \frac{1}{5}, \text{LCM} = 20$$

$$\Rightarrow \frac{5 + 4}{20} = \frac{9}{20} \dots (2)$$

Equate (1) and (2)

$$\frac{2x}{3} = \frac{9}{20}$$

Multiply both sides by 60

We will get

$$\frac{2x}{3} \times 60 = \frac{9}{20} \times 60$$

$$2x \times 20 = 9 \times 3$$

$$40x = 27$$

$$x = \frac{27}{40}$$

#463652

Topic: Solving Linear Equations in One Variable

Solve linear equation:

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

Solution

LCM of 2, 4 and 6 is 12

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

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

Multiply both sides by 12

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

$$7n = 252$$

$$n = \frac{252}{7}$$

$$n = 36$$

#463654**Topic:** Solving Linear Equations in One Variable

Solve linear equation:

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

SolutionTranspose $\frac{5x}{2}$ to LHS and 7 to RHS

We get,

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

$$LHS: x + \frac{5x}{2} - \frac{8x}{3}$$

LCM of 2 and 6 \Rightarrow 6

$$LHS \Rightarrow x + \frac{5x}{2} - \frac{8x}{3} \Rightarrow \frac{6x + 15x - 16x}{6} \Rightarrow \frac{5x}{6} \dots (1)$$

$$RHS: \frac{17}{6} - 7 \Rightarrow \frac{17 - 42}{6} = \frac{-25}{6} \dots (2)$$

LHS = RHS (equate (1) and (2))

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

$$x = -5$$

#463657**Topic:** Solving Linear Equations in One Variable

Solve linear equation:

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

Solution

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

Multiply both sides by 15, we will get

$$\frac{x-5}{3} \times 15 = \frac{x-3}{5} \times 15$$

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

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

Transpose 25 to RHS and $3x$ to LHS

We will get,

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

$$2x = 16$$

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

$$x = 8$$

#463660

Topic: Solving Linear Equations in One Variable

Solve linear equation:

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

Solution

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

LCM of 3 and 4 is 12

Multiply both sides by 12

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

$$3(3t-2) - 4(2t+3) = 8 - 12t$$

$$9t - 6 - 8t - 12 = 8 - 12t$$

$$t - 18 = 8 - 12t$$

Transpose $12t$ to LHS and 48 to RHS

$$t + 12t = 8 + 18$$

$$13t = 26$$

$$t = \frac{26}{13} = 2$$

#463662

Topic: Solving Linear Equations in One Variable

Solve linear equation:

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

Solution

Multiply both sides by 6

$$6\left(m - \frac{m-1}{2}\right) = \left(1 - \frac{m-2}{3}\right)6$$

$$6m - 3m + 3 = 6 - 2m + 4$$

$$3m + 3 = 10 - 2m$$

Transpose $2m$ to LHS and 3 to RHS

$$5m = 7$$

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

#463664**Topic:** Solving Linear Equations in One Variable

Simplify and solve the following linear equation:

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

Solution

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

Transpose $10t$ to LHS and 9 to RHS

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

$$-7t = 14$$

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

$$t = -2$$

#463665**Topic:** Solving Linear Equations in One Variable

Simplify and solve the following linear equation:

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

Solution

$$15y - 60 - 2y + 18 + 5y + 30 = 0$$

$$\Rightarrow 18y - 12 = 0$$

$$\Rightarrow y = \frac{12}{8}$$

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

#463667**Topic:** Solving Linear Equations in One Variable

Simplify and solve the following linear equation:

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

Solution

$$15z - 21 - 18z + 22 = 32z - 52 - 17$$

$$-3z + 1 = 32z - 69$$

Transpose $32z$ to LHS and 1 to RHS

$$-32z - 3z = -69 - 1$$

$$35z = 70$$

$$z = \frac{70}{35}$$

$$z = 2$$

#463669**Topic:** Solving Linear Equations in One Variable

Simplify and solve the following linear equation:

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

Solution

$$\frac{25}{100}(4f-3) = \frac{5}{100}(10f-9)$$

$$5(4f-3) = 10f-9$$

$$20f-15 = 10f-9$$

Transpose $10f$ to LHS and 15 to RHS

$$10f = 6$$

$$f = \frac{6}{10}$$

$$f = 0.6$$

#463671

Topic: Solving Linear Equations in One Variable

Solve the following equation:

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

Solution

Given, $\frac{8x-3}{3x} = 2$

Multiply both sides by $3x$

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

$$8x-3 = 6x$$

Transpose $6x$ to LHS and 3 to RHS

$$8x-6x = 3$$

$$2x = 3$$

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

#463675

Topic: Solving Linear Equations in One Variable

Solve the following equation:

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

Solution

Given, $\frac{9x}{7-6x} = 15$

Multiply both sides by $7-6x$

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

$$9x = 105 - 90x$$

Transpose $90x$ to LHS

$$9x + 90x = 105$$

$$99x = 105$$

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

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

#463678

Topic: Solving Linear Equations in One Variable

Solve the following equation:

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

Solution

Given, $\frac{z}{z+15} = \frac{4}{9}$

Multiply both sides by $9(z+15)$

$$9z = 4(z+15)$$

$$9z = 4z + 60$$

$$5z = 60$$

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

$$z = 12$$

#463682

Topic: Solving Linear Equations in One Variable

Solve the following equation:

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

Solution

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

Multiply both sides by $5(2-6y)$

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

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

Transpose $12y$ to LHS and 20 to RHS

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

$$3y = -24$$

$$y = -8$$

#463684

Topic: Solving Linear Equations in One Variable

Solve the following equation:

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

Solution

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

Multiply $3(y+2)$ to both sides

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

$$21y+12 = -4y-8$$

$$21y+4y = -8-12$$

$$25y = -20$$

$$y = \frac{-20}{25}$$

$$\Rightarrow y = \frac{-4}{5}$$

#463687

Topic: Solving Linear Equations in One Variable

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

Solution

Let ratio (common) be x

$$\therefore \text{Hari's age: } 5x, \text{ Harry's age} \Rightarrow 7x$$

and four years later: Ages will be $5x + 4$ and $7x + 4$

As per the question:

$$\frac{5x + 4}{7x + 4} = \frac{3}{4}$$

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

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

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

$$-x = -4$$

$$x = 4$$

$$\text{Hari's age} = 5x = 5 \times 4 = 20 \text{ years}$$

$$\text{Harry's age} = 7x = 7 \times 4 = 28 \text{ years}$$

#463690

Topic: Solving Linear Equations in One Variable

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

Solution

Let numerator of rational number be x

$$\therefore \text{Denominator will be } x + 8$$

The rational number will be in the form of $\frac{p}{q} = \frac{x}{x + 8}$

As per the question,

$$\frac{x + 17}{x + 8 - 1} = \frac{3}{2}$$

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

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

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

$$-x = -13$$

$$x = 13$$

$$\text{Numerator} \Rightarrow x = 13$$

$$\text{Denominator} \Rightarrow x + 8 = 13 + 8 = 21$$

$$\text{Rotational number} = \frac{13}{21}$$

#465874

Topic: Solving Linear Equations in One Variable

Verify that $-(-x) = x$ for

$$(i) x = \frac{11}{15} \quad (ii) x = -\frac{13}{17}$$

Solution

$$\text{i) L.H.S} = -(-x) = -\left(-\frac{11}{15}\right) = \frac{11}{15}$$

$$\text{R.H.S} = x = \frac{11}{15}$$

\therefore L.H.S = R.H.S

Hence, verified.

$$\text{i) L.H.S} = -(-x) = -\left[-\frac{(-13)}{17}\right] = -\frac{13}{17}$$

$$\text{R.H.S} = x = -\frac{13}{17}$$

\therefore L.H.S = R.H.S

Hence, verified.