EXERCISE 4.1

1. Complete the last column of the table.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Equation</th>
<th>Value</th>
<th>Say, whether the equation is satisfied. (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>x + 3 = 0</td>
<td>x = 3</td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
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<td>x = -3</td>
<td></td>
</tr>
<tr>
<td>(iv)</td>
<td>x − 7 = 1</td>
<td>x = 7</td>
<td></td>
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<tr>
<td>(v)</td>
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<td>x = 8</td>
<td></td>
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<tr>
<td>(vi)</td>
<td>5x = 25</td>
<td>x = 0</td>
<td></td>
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<td>x = -5</td>
<td></td>
</tr>
<tr>
<td>(ix)</td>
<td>(m/3) = 2</td>
<td>m = -6</td>
<td></td>
</tr>
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<tr>
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<td>m = 6</td>
<td></td>
</tr>
</tbody>
</table>

Solution:-

(i) x + 3 = 0
LHS = x + 3
By substituting the value of x = 3
Then,
LHS = 3 + 3 = 6
By comparing LHS and RHS
LHS ≠ RHS
∴ No, the equation is not satisfied.

(ii) x + 3 = 0
LHS = x + 3
By substituting the value of x = 0
Then,
LHS = 0 + 3 = 3
By comparing LHS and RHS
LHS ≠ RHS
∴ No, the equation is not satisfied.
(iii) \(x + 3 = 0\)
\[\text{LHS} = x + 3\]
By substituting the value of \(x = -3\)
Then,
\[\text{LHS} = -3 + 3 = 0\]
By comparing LHS and RHS
\[\text{LHS} = \text{RHS}\]
\[\therefore \text{Yes, the equation is satisfied}\]

(iv) \(x - 7 = 1\)
\[\text{LHS} = x - 7\]
By substituting the value of \(x = 7\)
Then,
\[\text{LHS} = 7 - 7 = 0\]
By comparing LHS and RHS
\[\text{LHS} \neq \text{RHS}\]
\[\therefore \text{No, the equation is not satisfied}\]

(v) \(x - 7 = 1\)
\[\text{LHS} = x - 7\]
By substituting the value of \(x = 8\)
Then,
\[\text{LHS} = 8 - 7 = 1\]
By comparing LHS and RHS
\[\text{LHS} = \text{RHS}\]
\[\therefore \text{Yes, the equation is satisfied}\]

(vi) \(5x = 25\)
\[\text{LHS} = 5x\]
By substituting the value of \(x = 0\)
Then,
\[\text{LHS} = 5 \times 0 = 0\]
By comparing LHS and RHS
\[\text{LHS} \neq \text{RHS}\]
\[\therefore \text{No, the equation is not satisfied}\]

(vii) \(5x = 25\)
LHS = 5x
By substituting the value of x = 5
Then,
LHS = 5 × 5 = 25
By comparing LHS and RHS
LHS = RHS
∴ Yes, the equation is satisfied.

(viii) 5x = 25
LHS = 5x
By substituting the value of x = -5
Then,
LHS = 5 × (-5) = -25
By comparing LHS and RHS
LHS ≠ RHS
∴ No, the equation is not satisfied.

(ix) \(\frac{m}{3} = 2\)
LHS = \(\frac{m}{3}\)
By substituting the value of m = -6
Then,
LHS = \(-6/3\) = -2
By comparing LHS and RHS
LHS ≠ RHS
∴ No, the equation is not satisfied.

(x) \(\frac{m}{3} = 2\)
LHS = \(\frac{m}{3}\)
By substituting the value of m = 0
Then,
LHS = 0/3 = 0
By comparing LHS and RHS
LHS ≠ RHS
∴ No, the equation is not satisfied.

(xi) \(\frac{m}{3} = 2\)
LHS = \(\frac{m}{3}\)
By substituting the value of \( m = 6 \)
Then, 
\[ \text{LHS} = \frac{6}{3} = 2 \]
By comparing LHS and RHS 
\[ \text{LHS} = \text{RHS} \]
\[ \therefore \text{Yes, the equation is satisfied.} \]

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2. Check whether the value given in the brackets is a solution to the given equation or not:
(a) \( n + 5 = 19 \)  \( (n = 1) \)
Solution:--
LHS = \( n + 5 \)
By substituting the value of \( n = 1 \)
Then,
\[ \text{LHS} = n + 5 \]
\[ = 1 + 5 \]
\[ = 6 \]
By comparing LHS and RHS 
\[ 6 \neq 19 \]
LHS \( \neq \) RHS
Hence, the value of \( n = 1 \) is not a solution to the given equation \( n + 5 = 19 \).

(b) \( 7n + 5 = 19 \)  \( (n = -2) \)
Solution:--
(c) \(7n + 5 = 19\) (\(n = 2\))

**Solution:**

LHS = 7n + 5

By substituting the value of \(n = 2\)

Then,

LHS = 7n + 5

\[
= (7 \times 2) + 5 \\
= 14 + 5 \\
= 19
\]

By comparing LHS and RHS

19 = 19

LHS = RHS

Hence, the value of \(n = 2\) is a solution to the given equation \(7n + 5 = 19\).
Hence, the value of $p = 1$ is not a solution to the given equation $4p - 3 = 13$.

(e) $4p - 3 = 13 \ (p = -4)$

Solution:
LHS = $4p - 3$
By substituting the value of $p = -4$
Then,
LHS = $4p - 3$
= $(4 \times (-4)) - 3$
= $-16 - 3$
= $-19$

By comparing LHS and RHS
-19 $\neq$ 13
LHS $\neq$ RHS
Hence, the value of $p = -4$ is not a solution to the given equation $4p - 3 = 13$.

(f) $4p - 3 = 13 \ (p = 0)$

Solution:
LHS = $4p - 3$
By substituting the value of $p = 0$
Then,
LHS = $4p - 3$
= $(4 \times 0) - 3$
= $0 - 3$
= $-3$

By comparing LHS and RHS
-3 $\neq$ 13
LHS $\neq$ RHS
Hence, the value of $p = 0$ is not a solution to the given equation $4p - 3 = 13$.

3. Solve the following equations by trial and error method:
(i) $5p + 2 = 17$

Solution:
LHS = $5p + 2$
By substituting the value of $p = 0$
Then,
Let, \( p = 0 \)

LHS = \( 5p + 2 \)
= \((5 \times 0) + 2\)
= \(0 + 2\)
= \(2\)

By comparing LHS and RHS
\(2 \neq 17\)
LHS \(\neq\) RHS

Hence, the value of \( p = 0 \) is not a solution to the given equation.

Let, \( p = 1 \)

LHS = \( 5p + 2 \)
= \((5 \times 1) + 2\)
= \(5 + 2\)
= \(7\)

By comparing LHS and RHS
\(7 \neq 17\)
LHS \(\neq\) RHS

Hence, the value of \( p = 1 \) is not a solution to the given equation.

Let, \( p = 2 \)

LHS = \( 5p + 2 \)
= \((5 \times 2) + 2\)
= \(10 + 2\)
= \(12\)

By comparing LHS and RHS
\(12 \neq 17\)
LHS \(\neq\) RHS

Hence, the value of \( p = 2 \) is not a solution to the given equation.

Let, \( p = 3 \)

LHS = \( 5p + 2 \)
= \((5 \times 3) + 2\)
= \(15 + 2\)
= \(17\)

By comparing LHS and RHS
\(17 = 17\)
LHS = RHS
Hence, the value of $p = 3$ is a solution to the given equation.

(ii) $3m - 14 = 4$
Solution:
LHS = $3m - 14$
By substituting the value of $m = 3$
Then,
LHS = $3m - 14$
   = $(3 \times 3) - 14$
   = $9 - 14$
   = $-5$
By comparing LHS and RHS
-5 $\neq$ 4
LHS $\neq$ RHS
Hence, the value of $m = 3$ is not a solution to the given equation.

Let, $m = 4$
LHS = $3m - 14$
   = $(3 \times 4) - 14$
   = $12 - 14$
   = $-2$
By comparing LHS and RHS
-2 $\neq$ 4
LHS $\neq$ RHS
Hence, the value of $m = 4$ is not a solution to the given equation.

Let, $m = 5$
LHS = $3m - 14$
   = $(3 \times 5) - 14$
   = $15 - 14$
   = $1$
By comparing LHS and RHS
1 $\neq$ 4
LHS $\neq$ RHS
Hence, the value of $m = 5$ is not a solution to the given equation.

Let, $m = 6$
LHS = 3m - 14
   = (3 \times 6) - 14
   = 18 - 14
   = 4

By comparing LHS and RHS

4 = 4

LHS = RHS

Hence, the value of m = 6 is a solution to the given equation.

4. Write equations for the following statements:

(i) The sum of numbers x and 4 is 9.

Solution:

The above statement can be written in the equation form as,

\[ x + 4 = 9 \]

(ii) 2 subtracted from y is 8.

Solution:

The above statement can be written in the equation form as,

\[ y - 2 = 8 \]

(iii) Ten times a is 70.

Solution:

The above statement can be written in the equation form as,

\[ 10a = 70 \]

(iv) The number b divided by 5 gives 6.

Solution:

The above statement can be written in the equation form as,

\[ \frac{b}{5} = 6 \]

(v) Three-fourth of t is 15.

Solution:

The above statement can be written in the equation form as,

\[ \frac{3}{4}t = 15 \]

(vi) Seven times m plus 7 gets you 77.

Solution:

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The above statement can be written in the equation form as,
Seven times \( m \) is \( 7m \)
\[ = 7m + 7 = 77 \]

(vii) One-fourth of a number \( x \) minus 4 gives 4.
Solution:
The above statement can be written in the equation form as,
One-fourth of a number \( x \) is \( x/4 \)
\[ = x/4 - 4 = 4 \]

(viii) If you take away 6 from 6 times \( y \), you get 60.
Solution:
The above statement can be written in the equation form as,
6 times of \( y \) is \( 6y \)
\[ = 6y - 6 = 60 \]

(ix) If you add 3 to one-third of \( z \), you get 30.
Solution:
The above statement can be written in the equation form as,
One-third of \( z \) is \( z/3 \)
\[ = 3 + z/3 = 30 \]

5. Write the following equations in statement forms:
(i) \( p + 4 = 15 \)
Solution:-
The sum of numbers \( p \) and 4 is 15.

(ii) \( m - 7 = 3 \)
Solution:-
7 subtracted from \( m \) is 3.

(iii) \( 2m = 7 \)
Solution:-
Twice of number \( m \) is 7.

(iv) \( m/5 = 3 \)
Solution:-
The number m divided by 5 gives 3.

(v) \( \frac{3m}{5} = 6 \)
Solution:
Three-fifth of m is 6.

(vi) \( 3p + 4 = 25 \)
Solution:
Three times p plus 4 gives you 25.

(vii) \( 4p - 2 = 18 \)
Solution:
Four times p minus 2 gives you 18.

(viii) \( \frac{p}{2} + 2 = 8 \)
Solution:
If you add half of a number p to 2, you get 8.

6. Set up an equation in the following cases:
(i) Irfan says that he has 7 marbles more than five times the marbles Parmit has. Irfan has 37 marbles. (Take m to be the number of Parmit’s marbles.)
Solution:
From the question it is given that,
Number of Parmit’s marbles = m
Then,
Irfan has 7 marbles more than five times the marbles Parmit has
\[ = 5 \times \text{Number of Parmit’s marbles} + 7 = \text{Total number of marbles Irfan having} \]
\[ = (5 \times m) + 7 = 37 \]
\[ = 5m + 7 = 37 \]

(ii) Laxmi’s father is 49 years old. He is 4 years older than three times Laxmi’s age. (Take Laxmi’s age to be y years.)
Solution:
From the question it is given that,
Let Laxmi’s age to be = y years old
Then,
Lakshmi’s father is 4 years older than three times of her age
(iii) The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. (Take the lowest score to be \( l \).)

**Solution:**
From the question it is given that,

Highest score in the class = 87

Let lowest score be \( l \)

\[ \text{Highest score in the class} = 2 \times \text{Lowest score} + 7 \]

\[ = (2 \times l) + 7 = 87 \]

\[ = 2l + 7 = 87 \]

(iv) In an isosceles triangle, the vertex angle is twice either base angle. (Let the base angle be \( b \) in degrees. Remember that the sum of angles of a triangle is 180 degrees).

**Solution:**
From the question it is given that,

We know that, the sum of angles of a triangle is 180°

Let base angle be \( b \)

Then,

Vertex angle = 2 \times \text{base angle} = 2b

\[ = b + b + 2b = 180° \]

\[ = 4b = 180° \]
1. Give first the step you will use to separate the variable and then solve the equation:

(a) \( x - 1 = 0 \)
Solution:-
We have to add 1 to both the side of given equation,
Then we get,
\[ x - 1 + 1 = 0 + 1 \]
\[ x = 1 \]

(b) \( x + 1 = 0 \)
Solution:-
We have to subtract 1 to both the side of given equation,
Then we get,
\[ x + 1 - 1 = 0 - 1 \]
\[ x = -1 \]

(c) \( x - 1 = 5 \)
Solution:-
We have to add 1 to both the side of given equation,
Then we get,
\[ x - 1 + 1 = 5 + 1 \]
\[ x = 6 \]

(d) \( x + 6 = 2 \)
Solution:-
We have to subtract 6 to both the side of given equation,
Then we get,
\[ x + 6 - 6 = 2 - 6 \]
\[ x = -4 \]

(e) \( y - 4 = -7 \)
Solution:-
We have to add 4 to both the side of given equation,
Then we get,
\[ y - 4 + 4 = -7 + 4 \]
\[ y = -3 \]
(f) \(y - 4 = 4\)
Solution:-
We have to add 4 to both the side of given equation,
Then we get,
\[= y - 4 + 4 = 4 + 4\]
\[= y = 8\]

(g) \(y + 4 = 4\)
Solution:-
We have to subtract 4 to both the side of given equation,
Then we get,
\[= y + 4 - 4 = 4 - 4\]
\[= y = 0\]

(h) \(y + 4 = -4\)
Solution:-
We have to subtract 4 to both the side of given equation,
Then we get,
\[= y + 4 - 4 = -4 - 4\]
\[= y = -8\]

2. Give first the step you will use to separate the variable and then solve the equation:
(a) \(3l = 42\)
Solution:-
Now we have to divide both sides of the equation by 3,
Then we get,
\[= 3l/3 = 42/3\]
\[= l = 14\]

(b) \(b/2 = 6\)
Solution:-
Now we have to multiply both sides of the equation by 2,
Then we get,
\[= b/2 \times 2 = 6 \times 2\]
\[= b = 12\]

(c) \(p/7 = 4\)
Solution:-
Now we have to multiply both sides of the equation by 7,
Then we get,
\[ p/7 \times 7 = 4 \times 7 \]
\[ p = 28 \]

(d) 4x = 25
Solution:-
Now we have to divide both sides of the equation by 4,
Then we get,
\[ 4x/4 = 25/4 \]
\[ x = 25/4 \]

(e) 8y = 36
Solution:-
Now we have to divide both sides of the equation by 8,
Then we get,
\[ 8y/8 = 36/8 \]
\[ y = 9/4 \]

(f) \( z/3 = (5/4) \)
Solution:-
Now we have to multiply both sides of the equation by 3,
Then we get,
\[ (z/3) \times 3 = (5/4) \times 3 \]
\[ z = 15/4 \]

(g) \( a/5 = (7/15) \)
Solution:-
Now we have to multiply both sides of the equation by 5,
Then we get,
\[ (a/5) \times 5 = (7/15) \times 5 \]
\[ a = 7/3 \]

(g) 20t = - 10
Solution:-
Now we have to divide both sides of the equation by 20,
Then we get,
\[ = \frac{20t}{20} = \frac{-10}{20} \]
\[ = \frac{x}{\frac{1}{2}} \]

3. Give the steps you will use to separate the variable and then solve the equation:
(a) \(3n - 2 = 46\)

Solution:-
First we have to add 2 to the both sides of the equation,
Then, we get,
\[ = 3n - 2 + 2 = 46 + 2 \]
\[ = 3n = 48 \]
Now,
We have to divide both sides of the equation by 3,
Then, we get,
\[ = \frac{3n}{3} = \frac{48}{3} \]
\[ = n = 16 \]

(b) \(5m + 7 = 17\)

Solution:-
First we have to subtract 7 to the both sides of the equation,
Then, we get,
\[ = 5m + 7 - 7 = 17 - 7 \]
\[ = 5m = 10 \]
Now,
We have to divide both sides of the equation by 5,
Then, we get,
\[ = \frac{5m}{5} = \frac{10}{5} \]
\[ = m = 2 \]

(c) \(\frac{20p}{3} = 40\)

Solution:-
First we have to multiply both sides of the equation by 3,
Then, we get,
\[ = \left(\frac{20p}{3}\right) \times 3 = 40 \times 3 \]
\[ = 20p = 120 \]
Now,
We have to divide both sides of the equation by 20,
Then, we get,
\[ = \frac{20p}{20} = \frac{120}{20} = 1 \]
\[ = p = 6 \]

(d) \( \frac{3p}{10} = 6 \)

**Solution:-**
First we have to multiply both sides of the equation by 10,
Then, we get,
\[ = \left(\frac{3p}{10}\right) \times 10 = 6 \times 10 = 3p = 60 \]
Now,
We have to divide both sides of the equation by 3,
Then, we get,
\[ = \frac{3p}{3} = \frac{60}{3} = p = 20 \]

4. Solve the following equations:
(a) \( 10p = 100 \)

**Solution:-**
Now,
We have to divide both sides of the equation by 10,
Then, we get,
\[ = \frac{10p}{10} = \frac{100}{10} = p = 10 \]

(b) \( 10p + 10 = 100 \)

**Solution:-**
First we have to subtract 10 to the both sides of the equation,
Then, we get,
\[ = 10p + 10 - 10 = 100 - 10 = 10p = 90 \]
Now,
We have to divide both sides of the equation by 10,
Then, we get,
\[ = \frac{10p}{10} = \frac{90}{10} = p = 9 \]
(c) \( \frac{p}{4} = 5 \)
Solution:
Now,
We have to multiply both sides of the equation by 4,
Then, we get,
\[ = \frac{p}{4} \times 4 = 5 \times 4 \]
\[ = p = 20 \]

(d) \( -\frac{p}{3} = 5 \)
Solution:
Now,
We have to multiply both sides of the equation by \(-3\),
Then, we get,
\[ = -\frac{p}{3} \times (-3) = 5 \times (-3) \]
\[ = p = -15 \]

(e) \( \frac{3p}{4} = 6 \)
Solution:
First we have to multiply both sides of the equation by 4,
Then, we get,
\[ = \frac{3p}{4} \times (4) = 6 \times 4 \]
\[ = 3p = 24 \]
Now,
We have to divide both sides of the equation by 3,
Then, we get,
\[ = \frac{3p}{3} = \frac{24}{3} \]
\[ = p = 8 \]

(f) \( 3s = -9 \)
Solution:
Now,
We have to divide both sides of the equation by 3,
Then, we get,
\[ = \frac{3s}{3} = \frac{-9}{3} \]
\[ = s = -3 \]

(g) \( 3s + 12 = 0 \)
Solution:-
First we have to subtract 12 to the both sides of the equation,
Then, we get,
\[ = 3s + 12 - 12 = 0 - 12 \]
\[ = 3s = -12 \]

Now,
We have to divide both sides of the equation by 3,
Then, we get,
\[ = \frac{3s}{3} = \frac{-12}{3} \]
\[ = s = -4 \]

(h) \( 3s = 0 \)
Solution:-
Now,
We have to divide both sides of the equation by 3,
Then, we get,
\[ = \frac{3s}{3} = 0/3 \]
\[ = s = 0 \]

(i) \( 2q = 6 \)
Solution:-
Now,
We have to divide both sides of the equation by 2,
Then, we get,
\[ = \frac{2q}{2} = 6/2 \]
\[ = q = 3 \]

(j) \( 2q - 6 = 0 \)
Solution:-
First we have to add 6 to the both sides of the equation,
Then, we get,
\[ = 2q - 6 + 6 = 0 + 6 \]
\[ = 2q = 6 \]

Now,
We have to divide both sides of the equation by 2,
Then, we get,
\[ = \frac{2q}{2} = 6/2 \]
\( q = 3 \)

**(k) \( 2q + 6 = 0 \)**

**Solution:**
First we have to subtract 6 to both sides of the equation,
Then, we get,
\[
= 2q + 6 - 6 = 0 - 6
\]
\[
= 2q = -6
\]
Now,
We have to divide both sides of the equation by 2,
Then, we get,
\[
= \frac{2q}{2} = \frac{-6}{2}
\]
\[
= q = -3
\]

**(l) \( 2q + 6 = 12 \)**

**Solution:**
First we have to subtract 6 to both sides of the equation,
Then, we get,
\[
= 2q + 6 - 6 = 12 - 6
\]
\[
= 2q = 6
\]
Now,
We have to divide both sides of the equation by 2,
Then, we get,
\[
= \frac{2q}{2} = \frac{6}{2}
\]
\[
= q = 3
\]
1. Solve the following equations:
(a) \( 2y + \frac{5}{2} = \frac{37}{2} \)
Solution:-
By transposing \( \frac{5}{2} \) from LHS to RHS it becomes \( -\frac{5}{2} \)
Then,
\[
2y = \left( \frac{37}{2} \right) - \left( \frac{5}{2} \right) = \frac{37-5}{2} = \frac{32}{2}
\]
Now, Divide both side by 2,
\[
\frac{2y}{2} = \frac{32}{2} \times \frac{1}{2} = 16 \times \frac{1}{2} = 8
\]
(b) \( 5t + 28 = 10 \)
Solution:-
By transposing 28 from LHS to RHS it becomes \( -28 \)
Then,
\[
5t = 10 - 28 = -18
\]
Now, Divide both side by 5,
\[
\frac{5t}{5} = -\frac{18}{5}
\]
(c) \( \frac{a}{5} + 3 = 2 \)
Solution:-
By transposing 3 from LHS to RHS it becomes \( -3 \)
Then,
\[
\frac{a}{5} = 2 - 3 = -1
\]
Now, Multiply both side by 5,
\[
\frac{a}{5} \times 5 = -1 \times 5
\]
(d) \( \frac{q}{4} + 7 = 5 \)

Solution:-
By transposing 7 from LHS to RHS it becomes -7
Then,
\[
\frac{q}{4} = 5 - 7
\]
\[
\frac{q}{4} = -2
\]

Now,
Multiply both side by 4,
\[
\left( \frac{q}{4} \right) \times 4 = -2 \times 4
\]
\[
a = -8
\]

(e) \( \frac{5}{2} x = -5 \)

Solution:-
First we have to multiply both the side by 2,
\[
\left( \frac{5x}{2} \right) \times 2 = -5 \times 2
\]
\[
5x = -10
\]

Now,
We have to divide both the side by 5,
Then we get,
\[
\frac{5x}{5} = \frac{-10}{5}
\]
\[
x = -2
\]

(f) \( \frac{5}{2} x = \frac{25}{4} \)

Solution:-
First we have to multiply both the side by 2,
\[
\left( \frac{5x}{2} \right) \times 2 = \left( \frac{25}{4} \right) \times 2
\]
\[
5x = \frac{25}{2}
\]

Now,
We have to divide both the side by 5,
Then we get,
\[
\frac{5x}{5} = \frac{25}{2} \times \frac{1}{5}
\]
\[
x = \frac{5}{2}
\]

(g) \( 7m + \frac{19}{2} = 13 \)
Solution:-
By transposing \((19/2)\) from LHS to RHS it becomes \(-19/2\)

Then,
\[ 7m = 13 - (19/2) \]
\[ 7m = (26 - 19)/2 \]
\[ 7m = 7/2 \]

Now,
Divide both side by 7,
\[ 7m/7 = (7/2)/7 \]
\[ m = (7/2) \times (1/7) \]
\[ m = 1/2 \]

(h) \(6z + 10 = -2\)
Solution:-
By transposing 10 from LHS to RHS it becomes \(-10\)
Then,
\[ 6z = -2 - 10 \]
\[ 6z = -12 \]

Now,
Divide both side by 6,
\[ 6z/6 = -12/6 \]
\[ m = -2 \]

(i) \((3/2)l = 2/3\)
Solution:-
First we have to multiply both the side by 2,
\[ (3l/2) \times 2 = (2/3) \times 2 \]
\[ 3l = 4/3 \]

Now,
We have to divide both the side by 3,
Then we get,
\[ 3l/3 = (4/3)/3 \]
\[ l = (4/3) \times (1/3) \]
\[ l = 4/9 \]

(j) \((2b/3) - 5 = 3\)
Solution:-
By transposing -5 from LHS to RHS it becomes 5
Then,
\[
\frac{2b}{3} = 3 + 5
\]
\[
\frac{2b}{3} = 8
\]
Now,
Multiply both side by 3,
\[
\left(\frac{2b}{3}\right) \times 3 = 8 \times 3
\]
\[
2b = 24
\]
And,
Divide both side by 2,
\[
\frac{2b}{2} = \frac{24}{2}
\]
\[
b = 12
\]

2. Solve the following equations:
(a) \(2(x + 4) = 12\)
Solution:-
Let us divide both the side by 2,
\[
\frac{2(x + 4)}{2} = \frac{12}{2}
\]
\[
x + 4 = 6
\]
By transposing 4 from LHS to RHS it becomes -4
\[
x = 6 - 4
\]
\[
x = 2
\]
(b) \(3(n - 5) = 21\)
Solution:-
Let us divide both the side by 3,
\[
\frac{3(n - 5)}{3} = \frac{21}{3}
\]
\[
n - 5 = 7
\]
By transposing -5 from LHS to RHS it becomes 5
\[
n = 7 + 5
\]
\[
n = 12
\]
(c) \(3(n - 5) = -21\)
Solution:-
Let us divide both the side by 3,
\[
\frac{3(n - 5)}{3} = \frac{-21}{3}
\]
= n - 5 = -7
By transposing -5 from LHS to RHS it becomes 5
= n = -7 + 5
= n = -2

(d) \(-4(2 + x) = 8\)
Solution:
Let us divide both the side by -4,
= \((-4(2 + x))/ (-4) = 8/ (-4)\)
= 2 + x = -2
By transposing 2 from LHS to RHS it becomes -2
= x = -2 - 2
= x = -4

(e) \(4(2 - x) = 8\)
Solution:
Let us divide both the side by 4,
= \((4(2 - x))/ 4 = 8/ 4\)
= 2 - x = 2
By transposing 2 from LHS to RHS it becomes -2
= -x = 2 - 2
= -x = 0
= x = 0

3. Solve the following equations:

(a) \(4 = 5(p - 2)\)
Solution:
Let us divide both the side by 5,
= \(4/5 = (5(p - 2))/5\)
= 4/5 = p -2
By transposing -2 from RHS to LHS it becomes 2
= \((4/5) + 2 = p\)
= \((4 + 10)/ 5 = p\)
= p = 14/5

(b) \(-4 = 5(p - 2)\)
Solution:
Let us divide both the side by 5,
\[ \frac{-4}{5} = \frac{5(p - 2)}{5} \]
\[ -\frac{4}{5} = p - 2 \]
By transposing \(-2\) from RHS to LHS it becomes 2
\[ -\left(\frac{4}{5}\right) + 2 = p \]
\[ = \frac{-4 + 10}{5} = p \]
\[ = p = \frac{6}{5} \]

(c) \[ 16 = 4 + 3(t + 2) \]
Solution:
By transposing \(4\) from RHS to LHS it becomes \(-4\)
\[ = 16 - 4 = 3(t + 2) \]
\[ = 12 = 3(t + 2) \]
Let us divide both the side by 3,
\[ = \frac{12}{3} = \frac{3(t + 2)}{3} \]
\[ = 4 = t + 2 \]
By transposing \(2\) from RHS to LHS it becomes \(-2\)
\[ = 4 - 2 = t \]
\[ = t = 2 \]

(d) \[ 4 + 5(p - 1) = 34 \]
Solution:
By transposing 4 from LHS to RHS it becomes \(-4\)
\[ = 5(p - 1) = 34 - 4 \]
\[ = 5(p - 1) = 30 \]
Let us divide both the side by 5,
\[ = \frac{5(p - 1)}{5} = \frac{30}{5} \]
\[ = p - 1 = 6 \]
By transposing \(-1\) from RHS to LHS it becomes 1
\[ = p = 6 + 1 \]
\[ = p = 7 \]

(e) \[ 0 = 16 + 4(m - 6) \]
Solution:
By transposing 16 from RHS to LHS it becomes \(-16\)
\[ = 0 - 16 = 4(m - 6) \]
\[ = -16 = 4(m - 6) \]
Let us divide both the side by 4,
= -16/4 = (4(m - 6))/4
= -4 = m - 6
By transposing -6 from RHS to LHS it becomes 6
= -4 + 6 = m
= m = 2

4. (a) Construct 3 equations starting with \( x = 2 \)
Solution:-
First equation is,
Multiply both side by 6
\[ 6x = 12 \] ...
[equation 1]
Second equation is,
Subtracting 4 from both side,
\[ 6x - 4 = 12 -4 \]
\[ 6x - 4 = 8 \] ...
[equation 2]
Third equation is,
Divide both side by 6
\[ \frac{6x}{6} - \frac{4}{6} = \frac{8}{6} \]
\[ x - \frac{4}{6} = \frac{8}{6} \] ...
[equation 3]

(b) Construct 3 equations starting with \( x = -2 \)
Solution:-
First equation is,
Multiply both side by 5
\[ 5x = -10 \] ...
[equation 1]
Second equation is,
Subtracting 3 from both side,
\[ 5x - 3 = -10 - 3 \]
\[ 5x - 3 = -13 \] ...
[equation 2]
Third equation is,
Dividing both sides by 2
\[ \frac{5x}{2} - \frac{3}{2} = \frac{-13}{2} \] ...
[equation 3]
1. Set up equations and solve them to find the unknown numbers in the following cases:

(a) Add 4 to eight times a number; you get 60.
Solution:-
Let us assume the required number be \( x \)
Eight times a number \( = 8x \)
The given above statement can be written in the equation form as,
\[ 8x + 4 = 60 \]
By transposing \( 4 \) from LHS to RHS it becomes \( 8x = 60 - 4 \)
\[ 8x = 56 \]
Divide both side by 8,
Then we get,
\[ \frac{8x}{8} = \frac{56}{8} \]
\[ x = 7 \]

(b) One-fifth of a number minus 4 gives 3.
Solution:-
Let us assume the required number be \( x \)
One-fifth of a number \( = \frac{1}{5} x = \frac{x}{5} \)
The given above statement can be written in the equation form as,
\[ \frac{x}{5} - 4 = 3 \]
By transposing \( -4 \) from LHS to RHS it becomes \( 4 \)
\[ \frac{x}{5} = 3 + 4 \]
\[ \frac{x}{5} = 7 \]
Multiply both side by 5,
Then we get,
\[ \frac{x}{5} \times 5 = 7 \times 5 \]
\[ x = 35 \]

(c) If I take three-fourths of a number and add 3 to it, I get 21.
Solution:-
Let us assume the required number be \( x \)
Three-fourths of a number \( = \frac{3}{4} x \)
The given above statement can be written in the equation form as,
\[\frac{3}{4} \times x + 3 = 21\]

By transposing 3 from LHS to RHS it becomes -3

\[\frac{3}{4} \times x = 21 - 3\]

\[\frac{3}{4} \times x = 18\]

Multiply both side by 4,

Then we get,

\[(\frac{3\times}{4}) \times 4 = 18 \times 4\]

\[3x = 72\]

Then,

Divide both side by 3,

\[\frac{3x}{3} = \frac{72}{3}\]

\[x = 24\]

(d) When I subtracted 11 from twice a number, the result was 15.

Solution:

Let us assume the required number be \(x\)

Twice a number \(= 2x\)

The given above statement can be written in the equation form as,

\[2x - 11 = 15\]

By transposing -11 from LHS to RHS it becomes 11

\[2x = 15 + 11\]

\[2x = 26\]

Then,

Divide both side by 2,

\[\frac{2x}{2} = \frac{26}{2}\]

\[x = 13\]

(e) Munna subtracts thrice the number of notebooks he has from 50, he finds the result to be 8.

Solution:

Let us assume the required number be \(x\)

Thrice the number \(= 3x\)

The given above statement can be written in the equation form as,

\[50 - 3x = 8\]

By transposing 50 from LHS to RHS it becomes -50

\[-3x = 8 - 50\]
\[-3x = -42\]
Then,
Divide both side by -3,
\[= (-3x/-3) = -42/-3\]
\[= x = 14\]

(f) Ibenhal thinks of a number. If she adds 19 to it and divides the sum by 5, she will get 8.
Solution:-
Let us assume the required number be \(x\)
The given above statement can be written in the equation form as,
\[= \frac{x + 19}{5} = 8\]
Multiply both side by 5,
\[= ((x + 19)/5) \times 5 = 8 \times 5\]
\[= x + 19 = 40\]
Then,
By transposing 19 from LHS to RHS it becomes - 19
\[= x = 40 - 19\]
\[= x = 21\]

(g) Anwar thinks of a number. If he takes away 7 from 5/2 of the number, the result is 23.
Solution:-
Let us assume the required number be \(x\)
5/2 of the number \(= \frac{5}{2} x\)
The given above statement can be written in the equation form as,
\[= \frac{5}{2} x - 7 = 23\]
By transposing -7 from LHS to RHS it becomes 7
\[= \frac{5}{2} x = 23 + 7\]
\[= \frac{5}{2} x = 30\]
Multiply both side by 2,
\[= ((\frac{5}{2} x) \times 2 = 30 \times 2\]
\[= 5x = 60\]
Then,
Divide both the side by 5
\[= 5x/5 = 60/5\]
\[= x = 12\]
2. Solve the following:
(a) The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. What is the lowest score?
Solution:-
Let us assume the lowest score be x
From the question it is given that,
The highest score is = 87
Highest marks obtained by a student in her class is twice the lowest marks plus 7 = 2x + 7
5/2 of the number = (5/2) x
The given above statement can be written in the equation form as,
Then,
= 2x + 7 = Highest score
= 2x + 7 = 87
By transposing 7 from LHS to RHS it becomes -7
    = 2x = 87 - 7
    = 2x = 80
Now,
Divide both the side by 2
    = 2x/2 = 80/2
    = x = 40
Hence, the lowest score is 40

(b) In an isosceles triangle, the base angles are equal. The vertex angle is 40°. What are the base angles of the triangle? (Remember, the sum of three angles of a triangle is 180°).
Solution:-
From the question it is given that,
We know that, the sum of angles of a triangle is 180°
Let base angle be b
Then,
    = b + b + 40° = 180°
    = 2b + 40 = 180°
By transposing 40 from LHS to RHS it becomes -40
    = 2b = 180 – 40
    = 2b = 140
Now,
Divide both the side by 2
= 2b/2 = 140/2
= b = 70°
Hence, 70° is the base angle of an isosceles triangle.

(c) Sachin scored twice as many runs as Rahul. Together, their runs fell two short of a double century. How many runs did each one score?
Solution:
Let us assume Rahul’s score be x
Then,
Sachin scored twice as many runs as Rahul is 2x
Together, their runs fell two short of a double century,
= Rahul’s score + Sachin’s score = 200 – 2
= x + 2x = 198
= 3x = 198
Divide both the side by 3,
= 3x/3 = 198/3
= x = 66
So, Rahul’s score is 66
And Sachin’s score is 2x = 2 × 66 = 132

3. Solve the following:
(i) Irfan says that he has 7 marbles more than five times the marbles Parmit has. Irfan has 37 marbles. How many marbles does Parmit have?
Solution:-
Let us assume number of Parmit’s marbles = m
From the question it is given that,
Then,
Irfan has 7 marbles more than five times the marbles Parmit has
= 5 × Number of Parmit’s marbles + 7 = Total number of marbles Irfan having
= (5 × m) + 7 = 37
= 5m + 7 = 37
By transposing 7 from LHS to RHS it becomes -7
= 5m = 37 – 7
= 5m = 30
Divide both the side by 5
= 5m/5 = 30/5
= m = 6
(ii) Laxmi’s father is 49 years old. He is 4 years older than three times Laxmi’s age. What is Laxmi’s age?
Solution:
Let Laxmi’s age to be \( y \) years old
From the question it is given that,
Lakshmi’s father is 4 years older than three times of her age
\[ = 3 \times \text{Laxmi’s age} + 4 = \text{Age of Lakshmi’s father} \]
\[ = (3 \times y) + 4 = 49 \]
\[ = 3y + 4 = 49 \]
By transposing 4 from LHS to RHS it becomes
\[ = 3y = 49 - 4 \]
\[ = 3y = 45 \]
Divide both the side by 3
\[ = \frac{3y}{3} = \frac{45}{3} \]
\[ = y = 15 \]
So, Lakshmi’s age is 15 years.

(iii) People of Sundargram planted trees in the village garden. Some of the trees were fruit trees. The number of non-fruit trees were two more than three times the number of fruit trees. What was the number of fruit trees planted if the number of non-fruit trees planted was 77?
Solution:
Let the number of fruit tress be \( f \).
From the question it is given that,
\[ 3 \times \text{number of fruit trees} + 2 = \text{number of non-fruit trees} \]
\[ = 3f + 2 = 77 \]
By transposing 2 from LHS to RHS it becomes -2
\[ = 3f = 77 - 2 \]
\[ = 3f = 75 \]
Divide both the side by 3
\[ = \frac{3f}{3} = \frac{75}{3} \]
\[ = f = 25 \]
So, number of fruit tree was 25.

4. Solve the following riddle:
I am a number, 
Take me seven times over
And add a fifty!
To reach a triple century
You still need forty!

**Solution:-**

Let us assume the number be $x$.
Take me seven times over and add a fifty $= 7x + 50$

To reach a triple century you still need forty

$$= (7x + 50) + 40 = 300$$

$$= 7x + 90 = 300$$

By transposing 90 from LHS to RHS it becomes $-90$

$$= 7x = 300 - 90$$

$$= 7x = 210$$

Divide both side by 7

$$= 7x/7 = 210/7$$

$$= x = 30$$

Hence the number is 30.