

EXERCISE 8.3

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Solve each of the following equations. Also, verify the result in each case.

1.  $6x + 5 = 2x + 17$

**Solution:**

Given  $6x + 5 = 2x + 17$

Transposing  $2x$  to LHS and  $5$  to RHS, we get

$$6x - 2x = 17 - 5$$

$$4x = 12$$

Dividing both sides by  $4$ , we get

$$4x/4 = 12/4$$

$$x = 3$$

Verification:

Substituting  $x = 3$  in the given equation, we get

$$6 \times 3 + 5 = 2 \times 3 + 17$$

$$18 + 5 = 6 + 17$$

$$23 = 23$$

Therefore LHS = RHS

Hence, verified.

2.  $2(5x - 3) - 3(2x - 1) = 9$

**Solution:**

Given  $2(5x - 3) - 3(2x - 1) = 9$

Simplifying the brackets, we get

$$2 \times 5x - 2 \times 3 - 3 \times 2x + 3 \times 1 = 9$$

$$10x - 6 - 6x + 3 = 9$$

$$10x - 6x - 6 + 3 = 9$$

$$4x - 3 = 9$$

Adding  $3$  to both sides, we get

$$4x - 3 + 3 = 9 + 3$$

$$4x = 12$$

Dividing both sides by  $4$ , we get

$$4x/4 = 12/4$$

Therefore  $x = 3$ .

Verification:

Substituting  $x = 3$  in LHS, we get

$$2(5 \times 3 - 3) - 3(2 \times 3 - 1) = 9$$

$$2 \times 12 - 3 \times 5 = 9$$

$$24 - 15 = 9$$

$$9 = 9$$

Thus, LHS = RHS

Hence, verified.

**3.  $(x/2) = (x/3) + 1$**

**Solution:**

Given  $(x/2) = (x/3) + 1$

Transposing  $(x/3)$  to LHS we get

$$(x/2) - (x/3) = 1$$

$$(3x - 2x)/6 = 1 \text{ [LCM of 3 and 2 is 6]}$$

$$x/6 = 1$$

Multiplying 6 to both sides we get,

$$x = 6$$

Verification:

Substituting  $x = 6$  in given equation we get

$$(6/2) = (6/3) + 1$$

$$3 = 2 + 1$$

$$3 = 3$$

Thus LHS = RHS

Hence, verified.

**4.  $(x/2) + (3/2) = (2x/5) - 1$**

**Solution:**

Given  $(x/2) + (3/2) = (2x/5) - 1$

Transposing  $(2x/5)$  to LHS and  $(3/2)$  to RHS, then we get

$$(x/2) - (2x/5) = -1 - (3/2)$$

$$(5x - 4x)/10 = (-2 - 3)/2 \text{ [LCM of 5 and 2 is 10]}$$

$$x/10 = -5/2$$

Multiplying both sides by 10 we get,

$$x/10 \times 10 = (-5/2) \times 10$$

$$x = (-50/2)$$

$$x = -25$$

Verification:

Substituting  $x = -25$  in given equation we get

$$(-25/2) + (3/2) = (-50/5) - 1$$

$$(-25 + 3)/2 = -10 - 1$$

$$(-22/2) = -11$$

$$-11 = -11$$

Thus LHS = RHS

Hence, verified.

**5.  $(3/4)(x - 1) = (x - 3)$**

**Solution:**

Given  $(3/4)(x - 1) = (x - 3)$

On simplifying the brackets both sides we get,

$$(3/4)x - (3/4) = (x - 3)$$

Now transposing  $(3/4)$  to RHS and  $(x - 3)$  to LHS

$$(3/4)x - x = (3/4) - 3$$

$$(3x - 4x)/4 = (3 - 12)/4$$

$$-x/4 = (-9/4)$$

Multiply both sides by -4 we get

$$-x/4 \times -4 = (-9/4) \times -4$$

$$x = 9$$

Verification:

Substituting  $x = 9$  in the given equation:

$$(3/4)(9 - 1) = (9 - 3)$$

$$(3/4)(8) = 6$$

$$3 \times 2 = 6$$

$$6 = 6$$

Thus LHS = RHS

Hence, verified.

**6.  $3(x - 3) = 5(2x + 1)$**

**Solution:**

Given  $3(x - 3) = 5(2x + 1)$

On simplifying the brackets we get,

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

Now transposing  $10x$  to LHS and  $9$  to RHS

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

$$-7x = 14$$

Now dividing both sides by  $-7$  we get

$$-7x/-7 = 14/-7$$

$$x = -2$$

Verification:

Substituting  $x = -2$  in the given equation we get

$$3(-2 - 3) = 5(-4 + 1)$$

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

$$-15 = -15$$

Thus LHS = RHS

Hence, verified.

**7.  $3x - 2(2x - 5) = 2(x + 3) - 8$**

**Solution:**

Given  $3x - 2(2x - 5) = 2(x + 3) - 8$

On simplifying the brackets on both sides, we get

$$3x - 2 \times 2x + 2 \times 5 = 2 \times x + 2 \times 3 - 8$$

$$3x - 4x + 10 = 2x + 6 - 8$$

$$-x + 10 = 2x - 2$$

Transposing  $x$  to RHS and  $2$  to LHS, we get

$$10 + 2 = 2x + x$$

$$3x = 12$$

Dividing both sides by  $3$ , we get

$$3x/3 = 12/3$$

$$x = 4$$

Verification:

Substituting  $x = 4$  on both sides, we get

$$3(4) - 2\{2(4) - 5\} = 2(4 + 3) - 8$$

$$12 - 2(8 - 5) = 14 - 8$$

$$12 - 6 = 6$$

$$6 = 6$$

Thus LHS = RHS

Hence, verified.

**8.  $x - (x/4) - (1/2) = 3 + (x/4)$**

**Solution:**

Given  $x - (x/4) - (1/2) = 3 + (x/4)$

Transposing  $(x/4)$  to LHS and  $(1/2)$  to RHS

$$x - (x/4) - (x/4) = 3 + (1/2)$$

$$(4x - x - x)/4 = (6 + 1)/2$$

$$2x/4 = 7/2$$

$$x/2 = 7/2$$

$$x = 7$$

Verification:

Substituting  $x = 7$  in the given equation we get

$$7 - (7/4) - (1/2) = 3 + (7/4)$$

$$(28 - 7 - 2)/4 = (12 + 7)/4$$

$$19/4 = 19/4$$

Thus LHS = RHS

Hence, verified.

**9.  $(6x - 2)/9 + (3x + 5)/18 = (1/3)$**

**Solution:**

Given  $(6x - 2)/9 + (3x + 5)/18 = (1/3)$

$$(6x(2) - 2(2) + 3x + 5)/18 = (1/3)$$

$$(12x - 4 + 3x + 5)/18 = (1/3)$$

$$(15x + 1)/18 = (1/3)$$

Multiplying both sides by 18 we get

$$(15x + 1)/18 \times 18 = (1/3) \times 18$$

$$15x + 1 = 6$$

Transposing 1 to RHS, we get

$$= 15x = 6 - 1$$

$$= 15x = 5$$

Dividing both sides by 15, we get

$$= 15x/15 = 5/15$$

$$= x = 1/3$$

Verification:



Substituting  $x = 1/3$  both sides, we get  
 $(6(1/3) - 2)/9 + (3(1/3) + 5)/18 = (1/3)$   
 $(2 - 2)/9 + (1 + 5)/18 = 1/3$   
 $(6/18) = (1/3)$   
 $(1/3) = (1/3)$   
Thus LHS = RHS  
Hence, verified.

**10.  $m - (m - 1)/2 = 1 - (m - 2)/3$**

**Solution:**

Given  $m - (m - 1)/2 = 1 - (m - 2)/3$   
 $(2m - m + 1)/2 = (3 - m + 2)/3$   
 $(m + 1)/2 = (5 - m)/3$   
 $(m + 1)/2 = (5/3) - (m/3)$   
 $(m/2) + (1/2) = (5/3) - (m/3)$   
Transposing  $(m/3)$  to LHS and  $(1/2)$  to RHS  
 $(m/2) + (m/3) = (5/3) - (1/2)$   
 $(3m + 2m)/6 = (10 - 3)/6$   
 $5m/6 = (7/6)$   
 $5m = 7$   
Dividing both sides by 5, we get  
 $5m/5 = 7/5$   
 $m = 7/5$

Verification:

Substituting  $m = 7/5$  on both sides, we get  
 $(7/5) - (7 - 5)/10 = 1 - (7 - 10)/15$   
 $(7/5) - (2/10) = (15 + 3)/15$   
 $(14 - 2)/10 = (15 + 3)/15$   
 $12/10 = 18/15$   
 $(6/5) = (6/5)$   
Thus LHS = RHS  
Hence, verified.

**11.  $(5x - 1)/3 - (2x - 2)/3 = 1$**

**Solution:**

$$\text{Given } (5x - 1)/3 - (2x - 2)/3 = 1$$

$$(5x - 1 - 2x + 2)/3 = 1$$

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

Multiplying both sides by 3 we get

$$(3x + 1)/3 \times 3 = 1 \times 3$$

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

Subtracting 1 from both sides we get

$$3x + 1 - 1 = 3 - 1$$

$$3x = 2$$

Dividing both sides by 3, we get

$$3x/3 = 2/3$$

$$x = 2/3$$

Verification:

Substituting  $x = 2/3$  in LHS, we get

$$(5(2/3) - 1)/3 - (2(2/3) - 2)/3 = 1$$

$$(10/3 - 1)/3 - (4/3 - 2)/3 = 1$$

$$(7/3)/3 - (-2/3)/3 = 1$$

$$(7/9) + (2/9) = 1$$

$$(9/9) = 1$$

$$1 = 1$$

Thus LHS = RHS

Hence, verified.

**12.  $0.6x + 4/5 = 0.28x + 1.16$**

**Solution:**

$$\text{Given } 0.6x + 4/5 = 0.28x + 1.16$$

Transposing  $0.28x$  to LHS and  $4/5$  to RHS, we get

$$0.6x - 0.28x = 1.16 - 4/5$$

$$0.32x = 1.16 - 0.8$$

$$0.32x = 0.36$$

Dividing both sides by  $0.32$ , we get

$$0.32 \times 0.32 = 0.360.32$$

$$x = 9/8$$

Verification:

Substituting  $x = 9/8$  on both sides, we get

$$0.6(9/8) + 45 = 0.28(9/8) + 1.16$$

$$5.4/8 + 4/5 = 2.52/8 + 1.16$$

$$0.675 + 0.8 = 0.315 + 1.16$$

$$1.475 = 1.475$$

Thus LHS = RHS

Hence, verified.

**13.  $0.5x + (x/3) = 0.25x + 7$**

**Solution:**

Given  $0.5x + (x/3) = 0.25x + 7$

$$(5/10)x + (x/3) = (25x/100) + 7$$

$$(x/2) + (x/3) = (x/4) + 7$$

Transposing  $(x/4)$  to LHS we get

$$(x/2) + (x/3) - (x/4) = 7$$

$$(6x + 4x - 3x)/12 = 7$$

$$(7x/12) = 7$$

Multiplying both sides by 12 we get

$$(7x/12) \times 12 = 7 \times 12$$

$$7x = 84$$

Dividing both sides by 7 we get

$$(7x/7) = (84/7)$$

$$x = 12$$

Verification:

Substituting  $x = 12$  in given equation we get

$$0.5(12) + (12/3) = 0.25(12) + 7$$

$$6 + 4 = 3 + 7$$

$$10 = 10$$

Thus LHS = RHS

Hence, verified.