

EXERCISE 8.2

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Solve each of the following equations and check your answers:

1. $x - 3 = 5$

Solution:

Given $x - 3 = 5$

Adding 3 to both sides we get,

$$x - 3 + 3 = 5 + 3$$

$$x = 8$$

Verification:

Substituting $x = 8$ in LHS, we get

$$\text{LHS} = x - 3 \text{ and RHS} = 5$$

$$\text{LHS} = 8 - 3 = 5 \text{ and RHS} = 5$$

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

Hence, verified.

2. $x + 9 = 13$

Solution:

Given $x + 9 = 13$

Subtracting 9 from both sides i.e. LHS and RHS, we get

$$x + 9 - 9 = 13 - 9$$

$$x = 4$$

Verification:

Substituting $x = 4$ on LHS, we get

$$\text{LHS} = 4 + 9 = 13 = \text{RHS}$$

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

Hence, verified.

3. $x - (3/5) = (7/5)$

Solution:

Given $x - (3/5) = (7/5)$

Add $(3/5)$ to both sides, we get

$$x - (3/5) + (3/5) = (7/5) + (3/5)$$

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

$$x = (10/5)$$

$$x = 2$$

Verification:

Substitute $x = 2$ in LHS of given equation, then we get

$$2 - (3/5) = (7/5)$$

$$(10 - 3)/5 = (7/5)$$

$$(7/5) = (7/5)$$

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

Hence, verified

4. $3x = 0$

Solution:

Given $3x = 0$

On dividing both sides by 3 we get,

$$(3x/3) = (0/3)$$

$$x = 0$$

Verification:

Substituting $x = 0$ in LHS we get

$$3(0) = 0$$

And $\text{RHS} = 0$

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

Hence, verified.

5. $(x/2) = 0$

Solution:

Given $x/2 = 0$

Multiplying both sides by 2, we get

$$(x/2) \times 2 = 0 \times 2$$

$$x = 0$$

Verification:

Substituting $x = 0$ in LHS, we get

$$\text{LHS} = 0/2 = 0 \text{ and } \text{RHS} = 0$$

$$\text{LHS} = 0 \text{ and } \text{RHS} = 0$$

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

Hence, verified.

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

Solution:

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

Adding $(1/3)$ to both sides, we get

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

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

$$x = (3/3)$$

$$x = 1$$

Verification:

Substituting $x = 1$ in LHS, we get

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

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

$$(2/3) = (2/3)$$

Therefore LHS = RHS

Hence, verified.

7. $x + (1/2) = (7/2)$

Solution:

Given $x + (1/2) = (7/2)$

Subtracting $(1/2)$ from both sides, we get

$$x + (1/2) - (1/2) = (7/2) - (1/2)$$

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

$$x = (6/2)$$

$$x = 3$$

Verification:

Substituting $x = 3$ in LHS we get

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

$$(6 + 1)/2 = (7/2)$$

$$(7/2) = (7/2)$$

Therefore LHS = RHS

Hence, verified.

8. $10 - y = 6$

Solution:

Given $10 - y = 6$

Subtracting 10 from both sides, we get

$$10 - y - 10 = 6 - 10$$

$$-y = -4$$

Multiplying both sides by -1, we get

$$-y \times -1 = -4 \times -1$$

$$y = 4$$

Verification:

Substituting $y = 4$ in LHS, we get

$$10 - y = 10 - 4 = 6 \text{ and RHS} = 6$$

Therefore LHS = RHS

Hence, verified.

9. $7 + 4y = -5$

Solution:

Given $7 + 4y = -5$

Subtracting 7 from both sides, we get

$$7 + 4y - 7 = -5 - 7$$

$$4y = -12$$

Dividing both sides by 4, we get

$$y = -12/4$$

$$y = -3$$

Verification:

Substituting $y = -3$ in LHS, we get

$$7 + 4y = 7 + 4(-3) = 7 - 12 = -5, \text{ and RHS} = -5$$

Therefore LHS = RHS

Hence, verified.

10. $(4/5) - x = (3/5)$

Solution:

Given $(4/5) - x = (3/5)$

Subtracting $(4/5)$ from both sides, we get

$$(4/5) - x - (4/5) = (3/5) - (4/5)$$

$$-x = (3 - 4)/5$$

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

$$x = (1/5)$$

Verification:

Substituting $x = (1/5)$ in LHS we get

$$(4/5) - (1/5) = (3/5)$$

$$(4 - 1)/5 = (3/5)$$

$$(3/5) = (3/5)$$

Therefore LHS = RHS

Hence, verified.

11. $2y - (1/2) = (-1/3)$

Solution:

Given $2y - (1/2) = (-1/3)$

Adding $(1/2)$ from both the sides, we get

$$2y - (1/2) + (1/2) = (-1/3) + (1/2)$$

$$2y = (-1/3) + (1/2)$$

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

$$2y = (1/6)$$

Now divide both the side by 2, we get

$$y = (1/12)$$

Verification:

Substituting $y = (1/12)$ in LHS we get

$$2(1/12) - (1/2) = (-1/3)$$

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

$$(2 - 6)/12 = (-1/3) \text{ [LCM of 6 and 2 is 12]}$$

$$(-4/12) = (-1/3)$$

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

Therefore LHS = RHS

Hence, verified.

12. $14 = (7x/10) - 8$

Solution:

Given $14 = (7x/10) - 8$

Adding 8 to both sides we get,

$$14 + 8 = (7x/10) - 8 + 8$$

$$22 = (7x/10)$$

Multiply both sides by 10 we get,

$$220 = 7x$$

$$x = (220/7)$$

Verification:

Substituting $x = (220/7)$ in RHS we get,

$$14 = (7/10) \times (220/7) - 8$$

$$14 = 22 - 8$$

$$14 = 14$$

Therefore LHS = RHS.

Hence, verified.

13. $3(x + 2) = 15$

Solution:

Given $3(x + 2) = 15$

Dividing both sides by 3 we get,

$$3(x + 2)/3 = (15/3)$$

$$(x + 2) = 5$$

Now subtracting 2 by both sides, we get

$$x + 2 - 2 = 5 - 2$$

$$x = 3$$

Verification:

Substituting $x = 3$ in LHS we get,

$$3(3 + 2) = 15$$

$$3(5) = 15$$

$$15 = 15$$

Therefore LHS = RHS

Hence, verified.

14. $(x/4) = (7/8)$

Solution:

Given $(x/4) = (7/8)$

Multiply both sides by 4 we get,

$$(x/4) \times 4 = (7/8) \times 4$$

$$x = (7/2)$$

Verification:

Substituting $x = (7/2)$ in LHS we get,

$$(7/2)/4 = (7/8)$$

$$(7/8) = (7/8)$$

Therefore LHS = RHS

Hence, verified.

15. $(1/3) - 2x = 0$

Solution:

Given $(1/3) - 2x = 0$

Subtract $(1/3)$ from both sides we get,

$$(1/3) - 2x - (1/3) = 0 - (1/3)$$

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

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

Divide both side by 2 we get,

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

$$x = (1/6)$$

Verification:

Substituting $x = (1/6)$ in LHS we get,

$$(1/3) - 2 (1/6) = 0$$

$$(1/3) - (1/3) = 0$$

$$0 = 0$$

Therefore LHS = RHS

Hence, verified.

16. $3(x + 6) = 24$

Solution:

Given $3(x + 6) = 24$

Divide both the sides by 3 we get,

$$3(x + 6)/3 = (24/3)$$

$$(x + 6) = 8$$

Now subtract 6 from both sides we get,

$$x + 6 - 6 = 8 - 6$$

$$x = 2$$

Verification:

Substituting $x = 2$ in LHS we get,

$$3(2 + 6) = 24$$

$$3(8) = 24$$

$$24 = 24$$

Therefore LHS = RHS

Hence, verified.

17. $3(x + 2) - 2(x - 1) = 7$

Solution:

Given $3(x + 2) - 2(x - 1) = 7$

On simplifying the brackets, we get

$$3 \times x + 3 \times 2 - 2 \times x + 2 \times 1 = 7$$

$$3x + 6 - 2x + 2 = 7$$

$$3x - 2x + 6 + 2 = 7$$

$$x + 8 = 7$$

Subtracting 8 from both sides, we get

$$x + 8 - 8 = 7 - 8$$

$$x = -1$$

Verification:

Substituting $x = -1$ in LHS, we get

$$3(x + 2) - 2(x - 1) = 7$$

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

$$(3 \times 1) - (2 \times -2) = 7$$

$$3 + 4 = 7$$

Therefore LHS = RHS

Hence, verified.

18. $8(2x - 5) - 6(3x - 7) = 1$

Solution:

Given $8(2x - 5) - 6(3x - 7) = 1$

On simplifying the brackets, we get

$$(8 \times 2x) - (8 \times 5) - (6 \times 3x) + (-6) \times (-7) = 1$$

$$16x - 40 - 18x + 42 = 1$$

$$16x - 18x + 42 - 40 = 1$$

$$-2x + 2 = 1$$

Subtracting 2 from both sides, we get

$$-2x + 2 - 2 = 1 - 2$$

$$-2x = -1$$

Multiplying both sides by -1, we get

$$-2x \times (-1) = -1 \times (-1)$$

$$2x = 1$$

Dividing both sides by 2, we get

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

$$x = (1/2)$$

Verification:

Substituting $x = (1/2)$ in LHS we get,

$$(8 \times (2 \times (1/2) - 5) - (6 \times (3 \times (1/2) - 7))) = 1$$

$$8(1 - 5) - 6(3/2 - 7) = 1$$

$$8 \times (-4) - (6 \times 3/2) + (6 \times 7) = 1$$

$$-32 - 9 + 42 = 1$$

$$-41 + 42 = 1$$

$$1 = 1$$

Therefore LHS = RHS

Hence, verified.

19. $6(1 - 4x) + 7(2 + 5x) = 53$

Solution:

Given $6(1 - 4x) + 7(2 + 5x) = 53$

On simplifying the brackets, we get

$$(6 \times 1) - (6 \times 4x) + (7 \times 2) + (7 \times 5x) = 53$$

$$6 - 24x + 14 + 35x = 53$$

$$6 + 14 + 35x - 24x = 53$$

$$20 + 11x = 53$$

Subtracting 20 from both sides, we get $20 + 11x - 20 = 53 - 20$

$$11x = 33$$

Dividing both sides by 11, we get

$$11x/11 = 33/11$$

$$x = 3$$

Verification:

Substituting $x = 3$ in LHS, we get

$$6(1 - 4 \times 3) + 7(2 + 5 \times 3) = 53$$

$$6(1 - 12) + 7(2 + 15) = 53$$

$$6(-11) + 7(17) = 53$$

$$- 66 + 119 = 53$$

$$53 = 53$$

Therefore LHS = RHS

Hence, verified.

20. $5(2 - 3x) - 17(2x - 5) = 16$

Solution:

Given $5(2 - 3x) - 17(2x - 5) = 16$

On expanding the brackets, we get

$$(5 \times 2) - (5 \times 3x) - (17 \times 2x) + (17 \times 5) = 16$$

$$10 - 15x - 34x + 85 = 16$$

$$10 + 85 - 34x - 15x = 16$$

$$95 - 49x = 16$$

Subtracting 95 from both sides, we get

$$- 49x + 95 - 95 = 16 - 95$$

$$- 49x = -79$$

Dividing both sides by $- 49$, we get

$$- 49x / -49 = -79 / -49$$

$$x = 79/49$$

Verification:

Substituting $x = (79/49)$ in LHS we get,

$$5(2 - 3 \times (79/49)) - 17(2 \times (79/49) - 5) = 16$$

$$(5 \times 2) - (5 \times 3 \times (79/49)) - (17 \times 2 \times (79/49)) + (17 \times 5) = 16$$

$$10 - (1185/49) - (2686/49) + 85 = 16$$

$$(490 - 1185 - 2686 + 4165)/49 = 16$$

$$784/49 = 16$$

$$16 = 16$$

Therefore LHS = RHS

Hence, verified.

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

Solution:

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

Adding 2 to both sides we get,

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

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

Multiply both sides by 5 we get

$$(x - 3)/5 \times 5 = 1 \times 5$$

$$x - 3 = 5$$

Now add 3 to both sides we get,

$$x - 3 + 3 = 5 + 3$$

$$x = 8$$

Verification:

Substituting $x = 8$ in LHS we get,

$$((8 - 3)/5) - 2 = -1$$

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

$$1 - 2 = -1$$

$$-1 = -1$$

Therefore LHS = RHS

Hence, verified.

22. $5(x - 2) + 3(x + 1) = 25$

Solution:

Given $5(x - 2) + 3(x + 1) = 25$

On simplifying the brackets, we get

$$(5 \times x) - (5 \times 2) + 3 \times x + 3 \times 1 = 25$$

$$5x - 10 + 3x + 3 = 25$$

$$5x + 3x - 10 + 3 = 25$$

$$8x - 7 = 25$$

Adding 7 to both sides, we get

$$8x - 7 + 7 = 25 + 7$$

$$8x = 32$$

Dividing both sides by 8, we get

$$8x/8 = 32/8$$

$$x = 4$$

Verification:

Substituting $x = 4$ in LHS, we get

$$5(4 - 2) + 3(4 + 1) = 25$$

$$5(2) + 3(5) = 25$$

$$10 + 15 = 25$$

$$25 = 25$$

Therefore LHS = RHS

Hence, verified.

