

Sample Problems

Solve each of the following equations. Make sure to check your solutions.

1.) $2x - 5 = 17$

4.) $\frac{3t}{4} - 10 = -4$

7.) $\frac{x+8}{3} = -2$

2.) $\frac{3}{8}x + \left(1\frac{4}{5}\right) = \frac{3}{10}$

5.) $\frac{t-5}{12} = 4$

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

3.) $\frac{a-10}{5} = -3$

6.) $\frac{2x-7}{3} = -1$

9.) $\frac{1}{5}x - \frac{2}{3} = \frac{26}{15}$

Practice Problems

Solve each of the following equations. Make sure to check your solutions.

1.) $2x - 3 = -11$

6.) $-4x - 3 = 13$

11.) $\frac{2x-1}{7} = -3$

2.) $-2x - 3 = 7$

7.) $\frac{1}{3}x + \frac{2}{5} = -\frac{34}{15}$

12.) $\frac{x}{7} - 1 = -3$

3.) $5x - 3 = 17$

8.) $5x - 6 = -6$

13.) $\frac{2}{3}b + \frac{3}{5} = -\frac{1}{15}$

4.) $\frac{x-3}{7} = -2$

9.) $\frac{x + \frac{3}{8}}{\frac{4}{2\frac{4}{5}}} = \frac{5}{16}$

14.) $\frac{a+1}{4} = -9$

5.) $\frac{x}{7} - 3 = -1$

10.) $-x + 5 = -7$

Sample Problems - Answers

1.) 11 2.) -4 3.) -5 4.) 8 5.) 53 6.) 2 7.) -14 8.) -30 9.) 12

Practice Problems - Answers

1.) -4 2.) -5 3.) 4 4.) -11 5.) 14 6.) -4 7.) -8 8.) 0
9.) $\frac{1}{2}$ 10.) 12 11.) -10 12.) -14 13.) -1 14.) -37

Sample Problems - Solutions

Solve each of the following equations. Make sure to check your solutions.

1. $2x - 5 = 17$ **11**

Solution:

$$2x - 5 = 17 \quad \text{add 5 to both sides}$$

$$2x = 22 \quad \text{divide by 2}$$

$$x = 11$$

We check: if $x = 11$, then

$$\text{RHS} = 2(11) - 5 = 22 - 5 = 17$$

$$\text{LHS} = 17$$

Thus our solution, $x = 11$ is correct.

2. $\frac{3}{8}x + \left(1\frac{4}{5}\right) = \frac{3}{10}$ **-4**

Solution: this is a very simple equation, much like $2x + 1 = 7$, only the numbers are fractions. But the principles and operations regarding equations are the same.

$$\frac{3}{8}x + \left(1\frac{4}{5}\right) = \frac{3}{10} \quad \text{convert mixed number to improper fraction}$$

$$\frac{3}{8}x + \frac{9}{5} = \frac{3}{10} \quad \text{subtract } \frac{9}{5} \text{ from both sides; } \frac{3}{10} - \frac{9}{5} = \frac{3}{10} - \frac{18}{10} = \frac{3-18}{10} = \frac{-15}{10} = \frac{-3}{2}$$

$$\frac{3}{8}x = \frac{-3}{2} \quad \text{divide both sides by } \frac{3}{8}$$

$$x = -4 \quad \left(\frac{-3}{2}\right) \div \left(\frac{3}{8}\right) = \frac{-3}{2} \cdot \frac{8}{3} = \frac{-24}{6} = -4$$

We check:

$$\text{RHS} = \frac{3}{8}(-4) + \left(1\frac{4}{5}\right) = \frac{3}{8} \cdot \frac{-4}{1} + \frac{9}{5} = \frac{-12}{8} + \frac{9}{5} = \frac{-3}{2} + \frac{9}{5} = \frac{-15}{10} + \frac{18}{10} = \frac{3}{10}$$

$$\text{LHS} = \frac{3}{10}$$

Thus our solution, -4 is correct.

3. $\frac{a-10}{5} = -3$ **-5**

Solution:

$$\frac{a-10}{5} = -3 \quad \text{multiply both sides by 5}$$

$$a-10 = -15 \quad \text{add 10 to both sides}$$

$$a = -5$$

We check: if $a = -5$, then

$$\begin{aligned}\text{LHS} &= \frac{-5 - 10}{5} = \frac{-15}{5} = -3 \\ \text{RHS} &= -3\end{aligned}$$

Thus our solution is correct.

4. $\frac{3t}{4} - 10 = -4$ 8
Solution:

$$\begin{aligned}\frac{3t}{4} - 10 &= -4 && \text{add } 10 \text{ to both sides} \\ \frac{3t}{4} &= 6 && \text{multiply both sides by } 4 \\ 3t &= 24 && \text{divide both sides by } 3 \\ t &= 8\end{aligned}$$

We check: if $t = 8$, then

$$\begin{aligned}\text{RHS} &= \frac{3t}{4} - 10 = \frac{3(8)}{4} - 10 = \frac{24}{4} - 10 = 6 - 10 = -4 \\ \text{LHS} &= -4\end{aligned}$$

Thus our solution, $t = 8$ is correct.

5. $\frac{t-5}{12} = 4$ 53
Solution:

$$\begin{aligned}\frac{t-5}{12} &= 4 && \text{multiply both sides by } 12 \\ t-5 &= 48 && \text{add } 5 \text{ to both sides} \\ t &= 53\end{aligned}$$

We check: if $t = 53$, then

$$\text{RHS} = \frac{53-5}{12} = \frac{48}{12} = 4 = \text{LHS}$$

Thus our solution, $t = 53$ is correct.

6. $\frac{2x-7}{3} = -1$ 2
Solution: We apply all operations to both sides.

$$\begin{aligned}\frac{2x-7}{3} &= -1 && \text{multiply by } 3 \\ 2x-7 &= -3 && \text{add } 7 \\ 2x &= 4 && \text{divide by } 2 \\ x &= 2\end{aligned}$$

We check:

$$\text{LHS} = \frac{2(2)-7}{3} = \frac{4-7}{3} = \frac{-3}{3} = -1 = \text{RHS}$$

Thus our solution, $x = 2$ is correct.

7. $\frac{x+8}{3} = -2$ **- 14**

Solution: We apply all operations to both sides.

$$\begin{aligned}\frac{x+8}{3} &= -2 && \text{multiply by } 3 \\ x+8 &= -6 && \text{subtract } 8 \\ x &= -14\end{aligned}$$

We check:

$$\text{LHS} = \frac{-14+8}{3} = \frac{-6}{3} = -2 = \text{RHS}$$

Thus our solution, $x = -14$ is correct.

8. $\frac{x}{3} + 8 = -2$ **- 30**

Solution: We apply all operations to both sides.

$$\begin{aligned}\frac{x}{3} + 8 &= -2 && \text{subtract } 8 \\ \frac{x}{3} &= -10 && \text{multiply by } 3 \\ x &= -30\end{aligned}$$

We check:

$$\text{LHS} = \frac{-30}{3} + 8 = -10 + 8 = -2 = \text{RHS}$$

Thus our solution, $x = -30$ is correct.

9. $\frac{1}{5}x - \frac{2}{3} = \frac{26}{15}$ **12**

Solution:

$$\begin{aligned}\frac{1}{5}x - \frac{2}{3} &= \frac{26}{15} && \text{add } \frac{2}{3} \text{ to both sides} && \frac{26}{15} + \frac{2}{3} = \frac{26}{15} + \frac{2 \cdot 5}{3 \cdot 5} = \\ \frac{1}{5}x &= \frac{12}{5} && \text{divide by } \frac{1}{5} && \frac{26}{15} + \frac{10}{15} = \frac{36}{15} = \frac{\cancel{3} \cdot 12}{\cancel{3} \cdot 5} = \frac{12}{5} \\ x &= 12 && && \frac{\frac{12}{5}}{\frac{1}{5}} = \frac{12}{5} \cdot \frac{5}{1} = \frac{12 \cdot \cancel{5}}{1 \cdot \cancel{5}} = \frac{12}{1} = 12\end{aligned}$$

We check: if $x = 12$, then

$$\begin{aligned}\text{LHS} &= \frac{1}{5} \cdot 12 - \frac{2}{3} = \frac{1}{5} \cdot \frac{12}{1} - \frac{2}{3} = \frac{12}{5} - \frac{2}{3} = \frac{12 \cdot 3}{5 \cdot 3} - \frac{2 \cdot 5}{3 \cdot 5} = \frac{36}{15} - \frac{10}{15} = \frac{26}{15} \\ \text{RHS} &= \frac{26}{15}\end{aligned}$$

Thus our solution, $x = 12$ is correct.