

One- and Two-Step Equations Practice Problems

In each equation below, choose which operation is best to do FIRST in order to solve the equation, and state why the other choices are NOT the best choice.

Example: $3x - 2 = 10$

- a) subtract 2
- b) divide by 3
- c) add 2
- d) subtract 10

Correct: c) You should +2 to both sides of the equation in order to cancel out the -2.

$$\begin{array}{r} 3x - 2 = 10 \\ +2 \quad +2 \\ \hline 3x \quad 12 \\ \hline 3 \quad 3 \\ \hline x = 4 \end{array}$$

a) subtracting 2 would not cancel out the -2.

$$\begin{array}{r} 3x - 2 = 10 \\ -2 \quad -2 \\ \hline 3x - 4 = 8 \end{array}$$

b) dividing by 3 would give you a messy fraction to work with (you can solve it this way, but it's much harder).

$$\begin{array}{r} \frac{3x - 2}{3} = \frac{10}{3} \\ x - \frac{2}{3} = \frac{10}{3} \end{array}$$

d) subtracting 10 would not help simplify the equation (you can solve it this way, but it means extra steps).

$$\begin{array}{r} 3x - 2 = 10 \\ -10 \quad -10 \\ \hline 3x - 12 = 0 \end{array}$$

1. $5 + x = 12$

- a) subtract 5
- b) subtract 12
- c) add x
- d) add 5

2. $2(x - 8) = -20$

- a) add 8
- b) distribute 2
- c) add 20
- d) subtract 2

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

- a) multiply by 3
- b) add 7
- c) divide by 3
- d) subtract 3

Solve the equation for the unknown variable. Remember to keep the equation balanced by performing the same operation on both sides of the equation in order to cancel!

4. $5 - x = 3$

8. $6 - \frac{2}{3}n = -8$

12. $\frac{x}{5} = 15$

5. $6 = -2(x - 5)$

9. $6x - 2x = -64$

13. $5 - 4(y + 1) = -3$

6. $4a - (a + 6) = 12 - 36$

10. $4s - 2(s - 5) = -2$

14. $3n + 3(1 - n) - n = -6$

7. $\frac{2x}{5} + 4 = -12$

11. $\frac{x + 7}{3} = 2$

15. $4 = \frac{5c + 2}{3}$

Determine if the given value makes the open sentence true or false. (An "open sentence" is an equation with a variable)

Example

$a = 6$

$-4a - 3 = -6a + 9$

$-4a - 3 = -6a + 9$

$-4(6) - 3 = -6(6) + 9$

$-24 - 3 = -36 + 9$

$-25 = -25$

$-4a - 3 = -6a + 9$ is

TRUE when $a = 6$.

16. $6d = 2d + 28$

$d = 7$

17. $9 = 0.5n$

$n = 45$

18.

$y = 8$

$8(y - 5) + 2y = -10$

In each example below, one student solved the equation correctly, and one student made an error. Decide which student made the error and where.

19. $-2n + 3 = 9$

Student A:

$$\begin{array}{r} -2n + 3 = 9 \\ +2 \quad +2 \\ n + 3 = 11 \\ -3 \quad -3 \\ n = 8 \end{array}$$

Student B:

$$\begin{array}{r} -2n + 3 = 9 \\ -3 \quad -3 \\ \frac{-2n}{-2} = \frac{6}{-2} \\ n = -3 \end{array}$$

20. $\frac{y}{6} + 12 = 10$

Student A:

$$\begin{array}{r} \frac{y}{6} + 12 = 10 \\ -12 \quad -12 \\ \frac{y}{6} = 2 \\ \div 6 \quad \div 6 \\ y = \frac{2}{6} = \frac{1}{3} \end{array}$$

Student B:

$$\begin{array}{r} \frac{y}{6} + 12 = 10 \\ -12 \quad -12 \\ 6\left(\frac{y}{6}\right) = (2)6 \\ y = 12 \end{array}$$

21. $4a - (a - 6) = -24$

Student A:

$$\begin{array}{r} 4a - (a - 6) = -24 \\ 4a - a + 6 = -24 \\ 3a + 6 = -24 \\ -6 \quad -6 \\ \frac{3a}{3} = -30 \\ a = -10 \end{array}$$

Student B:

$$\begin{array}{r} 4a - (a - 6) = -24 \\ 4a - a - 6 = -24 \\ 3a - 6 = -24 \\ +6 \quad +6 \\ \frac{3a}{3} = -18 \\ a = -6 \end{array}$$

22. $2 = \frac{5x - 7}{4}$

Student A:

$$\begin{array}{r} 2 = \frac{5x - 7}{4} \\ 4(2) = \left(\frac{5x - 7}{4}\right)4 \\ 8 = 5x - 7 \\ -8 \quad -8 \\ \frac{5x}{5} = \frac{-15}{5} \\ x = -3 \end{array}$$

Student B:

$$\begin{array}{r} 2 = \frac{5x - 7}{4} \\ 4(2) = \left(\frac{5x - 7}{4}\right)4 \\ 8 = 5x - 7 \\ +7 \quad +7 \\ \frac{15}{5} = \frac{5x}{5} \\ 3 = x \text{ or } x = 3 \end{array}$$