

# Solving Multi-step Equations & Inequalities (1A5.0)

Name \_\_\_\_\_

Class \_\_\_\_\_ Date \_\_\_\_\_

Score \_\_\_\_\_

Equations with **multiple steps** require you to take more steps to **isolate variable**.

1 Parentheses

2 Exponents

3 Multiplication  
Division

4 Addition  
Subtraction

A good shortcut for these problems is to work backwards through "PEMDAS."

We are working backwards to get **x by itself**, so we should focus on **addition and subtraction** first.

You must do the same thing on BOTH sides of the equation.

$$5x - 4 = 16$$

$$\begin{array}{r} +4 \quad +4 \\ \hline 5x - 4 = 16 \\ 5x = 20 \end{array}$$

$$\begin{array}{r} 5x = 20 \\ \hline 5 \quad 5 \\ x = 4 \end{array}$$

1 Add 5 to each side

2 Divide each side by 5 to isolate the variable.

1) Solve for x.

$$9(2x - 7) + 2 > 3(x + 39) + 2$$

A.  $x > 15$

B.  $x > 12\frac{1}{3}$

C.  $x > 12$

D.  $x > 9\frac{1}{2}$

2) Solve for x.

$$3(4x - 7) - 3 > 6x$$

A.  $x > -2$

B.  $x > -4$

C.  $x > 2$

D.  $x > 4$

3) Solve for x.

$$4(7 - x) + 2 > 6(5 - x)$$

A.  $x > 30$

B.  $x > -30$

C.  $x > 15$

D.  $x > 0$

4) Solve for x.

$$2(x - 2) - 3 < \frac{(12x - 8)}{4}$$

A.  $x > -\frac{11}{4}$

B.  $x > -5$

C.  $x > -\frac{5}{2}$

D.  $x > -2$

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5) Solve for x.

$$9(x + 1) + 6x > 10(3 + x)$$

- A.  $x > -3$
- B.  $x < \frac{3}{5}$
- C.  $x > \frac{21}{5}$
- D.  $x < 7$

6) Solve for x.

$$3(1 - x) + 4x = 17 - x$$

- A.  $x = 1.75$
- B.  $x = 7$
- C.  $x = 10$
- D.  $x = 12.5$

7) Solve for x.

$$2(6x - 4) + x = 2 - 5x$$

- A.  $x = \frac{1}{3}$
- B.  $x = \frac{3}{8}$
- C.  $x = \frac{5}{4}$
- D.  $x = 3$

8) Solve for x.

$$2(11 + 3x) + 4 = 1 + x$$

- A.  $x = 12.5$
- B.  $x = 5$
- C.  $x = -4$
- D.  $x = -5$

9) Solve for x.

$$4(x + 9) + 6 = 6x$$

- A.  $x = -21$
- B.  $x = 4\frac{1}{5}$
- C.  $x = 15$
- D.  $x = 21$

10) Solve for x.

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

- A.  $x = \frac{5}{2}$
- B.  $x = 3$
- C.  $x = 5$
- D.  $x = 10$

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11) Ariadne solved the equation  $7(3x + 2) = 35$  using the following steps:

Given:  $7(3x + 2) = 35$

Step 1:  $21x + 14 = 35$

Step 2:  $21x = 21$

Step 3:  $x = 1$

To get from Step 2 to Step 3, Ariadne—

- A. Subtracted 21 from both sides
- B. Divided both sides by  $x$
- C. Multiplied both sides by 21
- D. Divided both sides by 21

12) Galo solved the equation  $3(4x - 5) = 9$  using the following steps:

Given:  $3(4x - 5) = 9$

Step 1:  $12x - 15 = 9$

Step 2:  $12x = 24$

Step 3:  $x = 2$

To get from Step 1 to Step 2, Galo—

- A. Divided both sides by 12
- B. Subtracted 15 from both sides
- C. Added 15 to both sides
- D. Divided both sides by 3

13) Ayana solved the equation  $-2(6x + 4) = 2$  using the following steps:

Given:  $-2(6x - 4) = 2$

Step 1:  $-12x + 8 = 2$

Step 2:  $-12x - 6$

Step 3:  $x = \frac{1}{2}$

To get from Step 2 to Step 3, Ayana-

- A. Divided both sides by -6.
- B. Subtracted 12 from both sides
- C. Multiplied both sides by  $-\frac{1}{2}$ .
- D. Divided both sides by -12.

14) Arnold solved the equation  $3(1 - x) = 6(x + 2)$  using the following steps:

Given:  $3(1 - x) = 6(x + 2)$

Step 1:  $3 - 3x = 6x + 12$

Step 2:  $3 - 9x = 12$

Step 3:  $-9x = 9$

Step 4:  $x = -1$

To get from Step 1 to Step 2, Arnold—

- A. Added  $6x$  to both sides.
- B. Added  $3x$  from both sides.
- C. Subtracted  $6x$  from both sides.
- D. Subtracted 3 from both sides.

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15) Tiana solved the equation  $16(2+x) = 36$  using the following steps.

Given:  $16(2+x) = 36$

Step 1:  $32 + 16x = 36$

Step 2:  $16x = 4$

Step 3:  $x = \frac{1}{4}$

To get from the Given to Step 1, Tiana—

- A. multiplied both sides by 16
- B. divided both sides by 16
- C. multiplied 16 by  $(2 + x)$
- D. added 16 to  $(2 + x)$

16) Mitchell solved the inequality  $4(6x - 2) < 2x + 3$  using the following steps.

Given:  $4(6x - 2) < 2x + 3$

Step 1:  $24x - 8 < 2x + 3$

Step 2:  $22x - 8 < 3$

Step 3:  $22x \frac{1}{2} < 11$

Step 4:  $x < \frac{1}{2}$

To get from Step 1 to Step 2, Mitchell—

- A. Added 8 to both sides.
- B. Divided both sides by 22.
- C. Subtracted  $24x$  from both sides.
- D. Subtracted  $2x$  from both sides.