

Please get your clickers and your notebook.

Algebra

**2-5**

## Solving Two-Step Equations

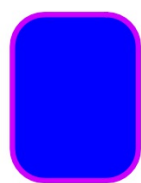
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7.EE.3, 7.EE.4.a

### What You'll Learn

To solve two-step equations using inverse operations

Get ready for the warm-up questions.



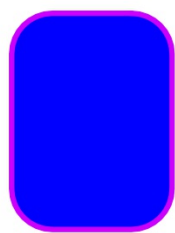
2.  $4b = 24$

A. 6

B.  $\frac{1}{6}$

C. 20

D. -20



5.  $\frac{h}{6} = -3$
- A. -18
  - B.  $-\frac{1}{2}$
  - C. 18
  - D. 3

## Solving two-step equations

### **Why Learn This?**

Detectives often retrace steps to find missing information. Like detectives, you can work step-by-step to find a missing quantity. You can solve a two-step equation by using inverse operations and the properties of equality to get the variable on one side of the equation.



For many equations, you can undo addition or subtraction first. Then you can multiply or divide to get the variable alone.

### EXAMPLE Undoing Subtraction First

1 Solve  $5n - 18 = -33$ .

$$5n - 18 = -33$$

$$5n - 18 + 18 = -33 + 18 \quad \leftarrow \text{To undo subtraction, add 18 to each side.}$$

$$5n = -15 \quad \leftarrow \text{Simplify.}$$

$$\frac{5n}{5} = \frac{-15}{5} \quad \leftarrow \text{To undo multiplication, divide each side by 5.}$$

$$n = -3 \quad \leftarrow \text{Simplify.}$$

**Check**  $5n - 18 = -33$   $\leftarrow$  Check your solution with the original equation.

$$5(-3) - 18 \stackrel{?}{=} -33 \quad \leftarrow \text{Substitute } -3 \text{ for } n.$$

$$-15 - 18 \stackrel{?}{=} -33 \quad \leftarrow \text{Simplify.}$$

$$-33 = -33 \quad \checkmark \quad \leftarrow \text{The solution checks.}$$

**1 EXAMPLE** Solve  $6r + 19 = 43$ .

$$6r + 19 = 43$$

$$6r + 19 - 19 = 43 - 19 \quad \leftarrow \text{To undo addition, subtract 19 from each side.}$$

$$6r = 24 \quad \leftarrow \text{Simplify.}$$

$$\frac{6r}{6} = \frac{24}{6} \quad \leftarrow \text{To undo multiplication, divide each side by 6.}$$

$$r = 4 \quad \leftarrow \text{Simplify.}$$

**EXAMPLE****Undoing Addition First**

2 Solve  $\frac{x}{3} + 11 = 16$ .

$$\frac{x}{3} + 11 = 16$$

$$\frac{x}{3} + 11 - 11 = 16 - 11 \quad \leftarrow \text{To undo addition, subtract 11 from each side.}$$

$$\frac{x}{3} = 5 \quad \leftarrow \text{Simplify.}$$

$$3\left(\frac{x}{3}\right) = 3(5) \quad \leftarrow \text{To undo division, multiply each side by 3.}$$

$$x = 15 \quad \leftarrow \text{Simplify.}$$

**2 EXAMPLE** Solve  $\frac{a}{5} - 4 = 10$ .

$$\frac{a}{5} - 4 = 10$$

$$\frac{a}{5} - 4 + 4 = 10 + 4$$

← To undo subtraction, add 4 to each side.

$$\frac{a}{5} = 14$$

← Simplify.

$$5\left(\frac{a}{5}\right) = 5(14)$$

← To undo division, multiply each side by 5.

$$a = 70$$

← Simplify.





1. Solve  $\frac{x}{5} + 35 = 75$ .

A.  $68\frac{3}{4}$

B. 200

C. 8

D. 550

**3 EXAMPLE** At the library sale, there was a \$2.50 admission charge. Old paperbacks were on sale for \$.25 each. If you only bought paperbacks and you spend \$4.50 in all, how many paperbacks did you buy.

Write an equation and solve the problem.

**Words** admission charge plus cost of paperbacks times Number of paperbacks equals total amount spent



Let  $n$  = the number of paperbacks bought.

**Equation**  $2.50 + 0.25n = 4.50$

$$2.5 + 0.25n = 4.5$$

← Solve the equation.

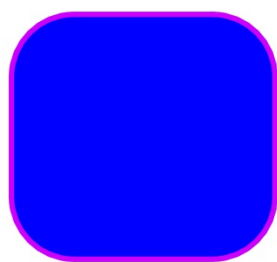
$$2.5 - 2.5 + 0.25n = 4.5 - 4.5$$

← Subtract 2.5 from each side.

$$0.25n = 2 \text{ or } n = 8$$

← Simplify.

You bought 8 books.



2.  $5p - 2 = 18$

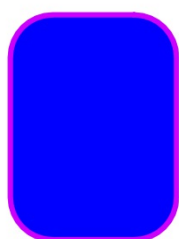
A.  $3\frac{1}{5}$

B. 100

C. 4

D.  $\frac{1}{4}$

**Solve each equation. Check Your Answer**



3.  $7m - (-16) = 100$

A. 77

B. 16.6

C. 12

D. 43.75

**Power down and return your clickers.  
You have time to begin work on your assignment.**

