

Alg 1 2.2

Solve equations using addition and subtraction
Solve equations using multiplication and division

→ Solve
→ Addition property of equality $+$ $-$
→ Multiplication property of equality \times \div

Algebra tiles

One-step
what makes it true?

$$\frac{8}{2} = \frac{8}{2}$$
$$4 = 4$$

 **Key Concept** Subtraction Property of Equality

Words If an equation is true and the same number is subtracted from each side of the equation, the resulting equivalent equation is also true.

Symbols For any real numbers a , b , and c , if $a = b$, then $a - c = b - c$.

Examples

$87 = 87$	$13 = 13$
$87 - 17 = 87 - 17$	$-28 = -28$
$70 = 70$	$-15 = -15$

$$\begin{array}{r} \textcircled{27} + k = 30 \\ -27 \quad -27 \\ \hline \end{array}$$

2A. $27 + k = 30$

$$k = 3$$

$$k = \text{km}$$

$$\begin{array}{r} -12 = -28 + \textcircled{16} \\ -16 \quad +16 \\ \hline \end{array}$$

2B. $-12 = p + 16$

$$\begin{array}{l} -28 = p \\ p = -28 \end{array}$$

KeyConcept Multiplication Property of Equality

Words If an equation is true and each side is multiplied by the same nonzero number, the resulting equation is equivalent.

Symbols For any real numbers a , b , and c , $c \neq 0$, if $a = b$, then $ac = bc$.

Example If $x = 5$, then $3x = 15$.

$$\frac{2x}{2} = \frac{10}{2}$$

$$1x = 5$$

$$x = 5$$

3A. $\frac{3}{5}k = 6$

$$\frac{\frac{3}{5}k}{\frac{5}{5}} = \frac{6}{\frac{5}{5}}$$

$$\frac{1}{4}n = 5$$

(Handwritten diagram showing multiplication of both sides by 4)

3B. $-\frac{1}{4} = \frac{2}{3}b$

$$|n = \frac{20}{1}$$

$$\therefore n = 20$$

$$k = 10$$

$$3 \cdot \frac{x}{3} = -2 \cdot 3$$

$$1x = -6$$

$$\frac{3x}{3}$$

$$\frac{1}{2}x = \frac{x}{2}$$

$$\frac{2}{3}x = \frac{2 \cdot 6}{3}$$

$$\frac{2}{3} \cdot 6 \quad 4$$

$$\frac{-\frac{1}{4}}{\frac{2}{3}} = \frac{\frac{2}{3}B}{\frac{2}{3}}$$

$$-\frac{3}{8} = B$$

1. $g + 5 = 33$

$33 - 5 = 28$

$$\begin{array}{r} g + 5 = 33 \\ -5 \quad -5 \\ \hline g = 28 \end{array}$$

2. $104 = y - 67$

$$\begin{array}{r} 104 = y - 67 \\ +67 \quad +67 \\ \hline 171 = y \end{array}$$

3. $\frac{2}{3} + w = 1\frac{1}{2}$

$$\begin{array}{r} -\frac{2}{3} \\ \frac{2}{3} \\ \hline w = \frac{5}{6} \end{array}$$

Solve

$$10. \frac{x}{7} = -5.7$$

$$T = -39$$

$$11. \frac{a}{36} = \frac{4}{9}$$

$$56. \frac{A}{36} = \frac{4}{9} \cdot 36$$

$$A = 16$$

$$12. \frac{3}{5}n = 10 \div \frac{2}{3}$$

$$15 = N$$