

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

Algebra tiles

$$\frac{2x}{2} = \frac{12}{2}$$

$$x = 6$$

$$\begin{array}{r} x + 3 = 8 \\ - 3 \quad - 3 \\ \hline x = 5 \end{array}$$

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

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

$x =$
 $n =$
 $t =$

11 $27 + 3 = 30$

2A $27 + k = 30$
 $\underline{-27 \quad -27}$
 $k = 3$

11 $-12 = -28 + 16$
 $-12 = -12$

2B. $-12 = p + 16$
 $\underline{-16 \quad -16}$

$-28 = p$

$-12 = 28 + 16$
 $-12 = 44$

$-12 = p + 16$
 $\underline{+12 \quad +12}$
 $0 = p + 28$

$x = \infty$

Key Concept 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 $3x = 15$.

$$\frac{3x}{3} = \frac{18}{3}$$
$$x = 6$$

~~$$\frac{1}{3} \cdot 3x = 18 \cdot \frac{1}{3}$$
$$x = 6$$~~

$$6 \cdot 5 = 5 \cdot 6$$
$$30 = 30$$

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

$$\frac{3}{5} \cdot 10 = 6$$

$$\frac{\frac{3}{5}k}{\frac{3}{5}} = \frac{6}{\frac{3}{5}}$$
$$k = 10$$

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

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

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

$$3(2x + 8) - 4x = 18x - 9$$

$$1. g + 5 = 33$$

$$= \begin{array}{r} -5 \quad -5 \\ \hline \end{array}$$

$$g = 28$$

$$28 + 5 = 33 \text{ ✓}$$

$$2. 104 = y - 67$$

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

$$= y$$

$$104 = 171 - 67$$

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

$$= \begin{array}{r} \frac{2}{3} \quad \frac{2}{3} \\ \hline w = 2\frac{1}{6} \end{array}$$

$$\frac{2}{3} + 2\frac{1}{6} = 1\frac{1}{2}$$

$$10. \frac{t}{7} = -5$$

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

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

$$n = 15$$

$$7. \frac{t}{7} = -5.7$$

$$t = -39.9$$

$$a = 16$$

$$36 \cdot \frac{a}{36} = \frac{5}{7} \cdot 36$$

$$a = 25\frac{2}{3}$$

$$0.\underline{\underline{666}}7_n = 10$$

$$a = 14.9925004$$