

Pre-Algebra
Skill Builder #LE - 2
Solving One-Step Linear Equations (Multiplication/Division)

Remember: Solving equations means finding the truth set, in other words value for the variable that makes the equation true.

From the last skill builder: $a = b \Leftrightarrow a + c = b + c$

Multiplication Property: $a = b \Leftrightarrow ac = bc \quad (c \neq 0)$

Note: This last property can also be thought of as a division property since division by a number is the same thing as multiplication by the number's reciprocal.

How can we use this property: We can use this property to isolate the variable and thus solve the equation.

Here are some illustrations of equations solved using this property:

1) $3x = 12$ the goal is to find the solution
 $\frac{1}{3} \cdot 3x = \frac{1}{3} \cdot 12$ we multiply by the reciprocal of 3
 $\frac{3}{3} \cdot x = \frac{12}{3}$ we rewrite this way in order to cancel
 $1 \cdot x = 4$ our two fractions have been simplified
 $x = 4$ this last step was the identity property of real numbers

2) $-5x = -120$ the goal is to find the solution
 $-\frac{1}{5}(-5x) = -\frac{1}{5}(-120)$ we multiply by the reciprocal of -5
 $\frac{-5}{-5} \cdot x = \frac{-120}{-5}$ we rewrite this way in order to cancel
 $1 \cdot x = 24$ remember negative divided by negative is positive
 $x = 24$ this last step was the identity property of real numbers

3) (*more difficult*) $\frac{2}{3}x = \frac{10}{39}$ we want to solve this equation
 $\frac{3}{2} \cdot \frac{2}{3}x = \frac{3}{2} \cdot \frac{10}{39}$ mult. by recip. of 2/3
 $1 \cdot x = \frac{5}{13}$ factors have been cancelled to get here
 $x = \frac{5}{13}$ identity property

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Solve the following equations.

1) $6a = -54$

2) $-4x = 84$

3) $4x = 404$

4) $-19b = -76$

5) $6x = 15$

6) $-4z = -26$

7) $-20y = 85$

8) $-\frac{4}{5}k = -\frac{48}{35}$
(a little more difficult)

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Answer Key:

1) $a = -9$

2) $x = -21$

3) $x = 101$

4) $b = 4$

5) $x = \frac{5}{2}$

6) $z = \frac{13}{2}$

7) $y = -\frac{17}{4}$

8) $k = \frac{12}{7}$