

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Solving Equations Using Addition and Subtraction

- When solving an equation, you must first isolate the variable.
- To isolate the variable means that you need to get the variable all by itself.
- To isolate the variable, move numbers to the other side of the equation using inverse operations.
- Inverse means opposite.
- The inverse operation of addition is subtraction.
- The inverse operation of subtraction is addition.
- When solving for a variable it is important to SHOW your WORK!
- Once you find the value of the variable, check to make sure your answer is a solution.
- The Addition Property of Equality states that when you add the same number to each side of an equation, the two sides remain equal.
- The Subtraction Property of Equality states that when you subtract the same number to each side of an equation, the two sides remain equal.
- Solve and check the equation below. Be sure to show all work!

$\begin{array}{r} x - 4 = 12 \\ \underline{-4 \quad -4} \\ \boxed{x = 8} \end{array}$	<p>Check:</p> $\begin{array}{l} (8) + 4 \stackrel{?}{=} 12 \\ 12 = 12 \checkmark \end{array}$
$\begin{array}{r} x - 5 = 25 \\ +5 \quad +5 \\ \boxed{x = 30} \end{array}$	<p>Check:</p> $\begin{array}{l} (30) - 5 = 25 \\ 25 = 25 \checkmark \end{array}$

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Practice: Solving Equations Using Addition and Subtraction

Solve and check each equation below.

<p>#1</p> $\begin{array}{r} x - 7 = 14 \\ + 7 \quad + 7 \\ \hline x = 21 \end{array}$	<p>Check:</p> $\begin{array}{r} (21) - 7 \stackrel{?}{=} 14 \\ 14 = 14 \\ \checkmark \end{array}$
<p>#2</p> $\begin{array}{r} 12 + x = 19 \\ - 12 \quad - 12 \\ \hline x = 7 \end{array}$	<p>Check:</p> $\begin{array}{r} 12 + (7) \stackrel{?}{=} 19 \\ 19 = 19 \\ \checkmark \end{array}$

<p>#3</p> $\begin{array}{r} 23 = x - 7 \\ + 7 \quad + 7 \\ \hline 30 = x \end{array}$	<p>Check:</p> $\begin{array}{r} 23 \stackrel{?}{=} (30) - 7 \\ 23 = 23 \\ \checkmark \end{array}$
<p>#4</p> $\begin{array}{r} 60 = x + 15 \\ - 15 \quad - 15 \\ \hline 45 = x \end{array}$	<p>Check:</p> $\begin{array}{r} 60 \stackrel{?}{=} (45) + 15 \\ 60 = 60 \checkmark \end{array}$

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Solving Equations Using Multiplication and Division

- When solving an equation, you must first isolate the variable.
- The inverse operation of multiplication is division.
- The inverse operation of division is multiplication.
- Once you find the value of the variable, check to make sure your answer is a solution.
- The Multiplication Property of Equality states that when you multiply each side of the equation by the same number, the two sides remain equal.
- The Division Property of Equality states that when you divide each side of the equation by the same number, the two sides remain equal.
- Two different ways to write division: fraction and  $\div$
- Solve and check the equation below. Be sure to show all work!

<p>"4 times g" <math>4g = 24</math></p> $\frac{4g}{4} = \frac{24}{4}$ $g = 6$ <p>inverse of mult = div</p>	<p>Check:</p> $4(6) \stackrel{?}{=} 24$ $24 = 24 \checkmark$
$5 \cdot (k \div 5) = 7 \cdot 5$ $k = 35$	<p>Check: ?</p> $(35) \div 5 \stackrel{?}{=} 7$ $7 = 7 \checkmark$

- The Multiplicative Inverse Property states that a number multiplied by its reciprocal is always one.
- If a number is being multiplied by a variable, you can isolate the variable by multiplying by the reciprocal of the coefficient.

$\frac{2}{1} \cdot \frac{1}{2}g = 6 \cdot \frac{2}{1}$ $g = 12$	<p>Check:</p> $\frac{1}{2}(12) = 6$ $6 = 6 \checkmark$
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$$6 \div \frac{1}{2} \rightarrow 6 \times \frac{2}{1}$$

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Practice: Solving Equations Using Multiplication and Division

Solve and check each equation below.

<p style="text-align: center;">#1</p> $\begin{array}{r} 7g = 56 \\ \hline \hline \end{array}$ $g = 8$	<p style="text-align: center;">Check:</p> $7(8) \stackrel{?}{=} 56$ $56 = 56$ <p style="text-align: right;">✓</p>
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<p style="text-align: center;">#2</p> $4 \cdot \frac{m}{4} = 9 \cdot 4$ $m = 36$	<p style="text-align: center;">Check:</p> $\frac{(36)}{4} \stackrel{?}{=} 9$ $9 = 9$ <p style="text-align: right;">✓</p>
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<p style="text-align: center;">#3</p> $\left[ \frac{4}{3} \right] \cdot \left[ \frac{3}{4} \right] h = 15 \cdot \frac{4}{3} = \frac{60}{3}$ $h = 20$	<p style="text-align: center;">Check:</p> $\frac{3}{4} \cdot \left( \frac{20}{1} \right) = 15$ $\frac{60}{4} = 15$ $15 = 15$ <p style="text-align: right;">✓</p>
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<p style="text-align: center;">#4</p> $\frac{5}{3} \cdot \frac{12}{1} = \frac{3}{5} y \cdot \frac{5}{3}$ $\frac{60}{3} = y$ $20 = y$	<p style="text-align: center;">Check:</p> $12 = \frac{3}{5} \cdot \left( \frac{20}{1} \right)$ $12 = \frac{60}{5}$ $12 = 12$ <p style="text-align: right;">✓</p>
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