## Solving One-Step Equations Using Integers

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Visual</th>
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<tbody>
<tr>
<td>Inverse Operations</td>
<td>Opposite operations that <strong>undo</strong> each other.</td>
<td>+ and – addition &amp; subtraction, x and ÷ multiplication &amp; division</td>
</tr>
<tr>
<td>Addition Property of Equality</td>
<td>If you add the same # to both sides of an equation, the sides stay equal (=)</td>
<td>5 = 5, 5 + 2 = 5 + 2</td>
</tr>
<tr>
<td>Subtraction Property of Equality</td>
<td>If you subtract the same # from both sides of an equation, the sides stay equal (=)</td>
<td>7 = 7, 7 - 6 = 7 - 6</td>
</tr>
<tr>
<td>Multiplication Property of Equality</td>
<td>If you multiply both sides of an equation by the same #, the sides stay equal (=)</td>
<td>2 = 2, 2(5) = 2(5)</td>
</tr>
<tr>
<td>Division Property of Equality</td>
<td>If you divide both sides of an equation by the same #, the sides stay equal (=)</td>
<td>4 = 4, 4 ÷ 2 = 4 ÷ 2, 2 = 2</td>
</tr>
</tbody>
</table>
Rules to Solving Equations

Your goal is to get the **Variable** alone by itself on **one** side of the equation.
(In other words, you are trying to **isolate** the variable)

When you are solving equations, you MUST use **Inverse Operations** to isolate the variable.

Whatever you do to **One side** of an equation, you must do to the **other side** of the equation.
(In other words, you must keep the equation **balanced/equal**.)

Solving an equation is like lifting weights....

If you **add** or **subtract** weight from one side of the barbell, you must **add** or **subtract** the same amount of weight from the other side of the barbell to keep it balanced.
Solve the equations below AND check your solution

\[
y + 14 = 20
\]
\[
\begin{align*}
-14 &= -14 \\
y &= 6
\end{align*}
\]
\[
x - 3 = -8
\]
\[
\begin{align*}
+3 &= +3 \\
x &= -5
\end{align*}
\]
\[
z - 4 = 16
\]
\[
\begin{align*}
+4 &= +4 \\
z &= 20
\end{align*}
\]

Check:

\[
6 + 14 = 20 \checkmark
\]
\[
-5 - 3
\]
\[
-5 + (-3) = -8 \checkmark
\]

\[
b + 25 = -25
\]
\[
\begin{align*}
-25 &= -25 \\
b &= -25 - 25 \\
b &= -25 + (-25) \\
b &= -50
\end{align*}
\]

Check:

\[
-50 + 25 = -25 \checkmark
\]

Check:

\[
d - 5 = 7
\]
\[
\begin{align*}
+5 &= +5 \\
d &= 12
\end{align*}
\]

Check:

\[
12 - 5 = 7 \checkmark
\]
Solve the equations below AND check your solution

\[
\frac{8t}{8} = \frac{48}{8} \quad \frac{-30}{-6} = \frac{-6x}{-6} \quad \frac{-2y}{-2} = \frac{12}{-2}
\]

\[
t = 6 \quad x = 5 \quad y = -6
\]

Check:
\[
8(6) = 48 \checkmark \quad -30 = -6(5) \checkmark \quad -2(-6) = 12 \checkmark
\]

\[
6 \cdot \frac{k}{6} = 10 \cdot 6 \quad 3 \cdot 20 = \frac{x}{3} \cdot 3 \quad -5 \cdot \frac{y}{-5} = -12 \cdot -5
\]

\[
k = 60 \quad x = 60 \quad y = 60
\]

Check:
\[
\frac{60}{6} = 10 \checkmark \quad 20 = \frac{60}{3} \checkmark \quad \frac{60}{-5} = -12 \checkmark
\]