

Lesson 7-4

Example 1 Solve an Inequality Using Subtraction

Solve $y + 9 < 7$. Check your solution.

$$\begin{array}{ll} y + 9 < 7 & \text{Write the inequality.} \\ y + 9 - 9 < 7 - 9 & \text{Subtract 9 from each side.} \\ y < -2 & \text{Simplify.} \end{array}$$

To check your solution, try any number less than -2 .

$$\begin{array}{ll} \text{CHECK} & y + 9 < 7 & \text{Write the inequality.} \\ & -3 + 9 < 7 & \text{Replace } y \text{ with } -3. \\ & 6 < 7 & \text{This statement is true.} \end{array}$$

Any number less than -2 will make the statement true. Therefore, the solution is $y < -2$.

Example 2 Solve an Inequality Using Addition

Solve $5 \geq m - 2$. Check your solution.

$$\begin{array}{ll} 5 \geq m - 2 & \text{Write the inequality.} \\ 5 + 2 \geq m - 2 + 2 & \text{Add 2 to each side.} \\ 7 \geq m & \text{Simplify.} \end{array}$$

CHECK You can check your result by replacing m in the original inequality with a number less than or equal to 7.

The solution is $7 \geq m$ or $m \leq 7$.

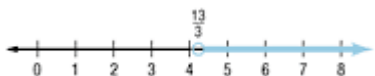
Example 3 Graph Solutions of Inequalities

Solve $w - \frac{1}{3} > 4$. Graph the solution on a number line.

$$\begin{array}{ll} w - \frac{1}{3} > 4 & \text{Write the inequality.} \\ w - \frac{1}{3} + \frac{1}{3} > 4 + \frac{1}{3} & \text{Add } \frac{1}{3} \text{ to each side.} \\ w > \frac{12}{3} + \frac{1}{3} & \text{Rewrite 4 as a fraction with a denominator of 3.} \\ w > \frac{13}{3} \text{ or } 4\frac{1}{3} & \text{Simplify.} \end{array}$$

The solution is $w > 4\frac{1}{3}$. Check your solution.

Graph the solution.



Example 4 Use an Inequality to Solve a Problem

BAKE SALE Susan has \$5 to spend at the school bake sale. She has already spent \$3 on cupcakes and would like to buy some cookies which cost \$0.35 each. Find the maximum number of cookies she can buy.

Explore We need to find the maximum number of cookies Susan can buy.

Plan Let n represent the maximum number of cookies Susan can buy. Write an inequality to represent the problem.

$$\begin{array}{ccccccc} \underbrace{\text{Cost of cupcakes}} & \text{plus} & \underbrace{\text{cost of cookies}} & \text{is less than or equal to} & \underbrace{\$5} \\ 3 & + & 0.35n & \leq & 5 \end{array}$$

Solve

$$\begin{array}{ll} 3 + 0.35n \leq 5 & \text{Write the inequality.} \\ 3 - 3 + 0.35n \leq 5 - 3 & \text{Subtract 3 from each side.} \\ 0.35n \leq 2 & \text{Simplify.} \\ \frac{0.35n}{0.35} \leq \frac{2}{0.35} & \text{Divide each side by 0.35.} \\ n \leq 5.7142\dots & \text{Simplify.} \end{array}$$

So, Susan can buy a maximum of 5 whole cookies. Six would be more than 5.7142... .

Examine Check by choosing an amount less than or equal to 5, say 4. Then Susan would spend $3 + 0.35(4)$ or \$4.40 in all. Since $\$4.40 < \5 , the answer is reasonable.

So, the maximum number of cookies Susan can buy is 5.