

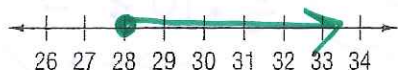
5-1 Notes Solving Inequalities by Addition and Subtraction

Solve Inequalities by Addition & Subtraction. If any number is added to each side of a true inequality, the resulting inequality is also true. If any number is subtracted from each side, the resulting inequality will still be true.

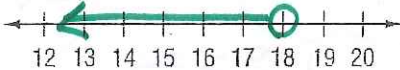
● \geq or \leq
○ $>$ or $<$

Solve each inequality. Check your solution, and then graph it on a number line.

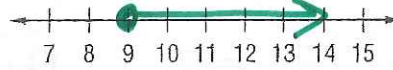
$$\begin{array}{r} 1. \quad t - 12 \geq 16 \\ \quad +12 \quad +12 \\ \hline t \geq 28 \end{array}$$



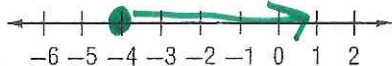
$$\begin{array}{r} 2. \quad n - 12 < 6 \\ \quad +12 \quad +12 \\ \hline n < 18 \end{array}$$



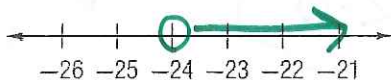
$$\begin{array}{r} 3. \quad 6 \leq g - 3 \\ \quad +3 \quad +3 \\ \hline 9 \leq g \end{array}$$



$$\begin{array}{r} 4. \quad t + 12 \geq 8 \\ \quad -12 \quad -12 \\ \hline t \geq -4 \end{array}$$



$$\begin{array}{r} 5. \quad n + 12 > -12 \\ \quad -12 \quad -12 \\ \hline n > -24 \end{array}$$



$$\begin{array}{r} 6. \quad 16 \leq h + 9 \\ \quad -9 \quad -9 \\ \hline 7 \leq h \end{array}$$



Define a variable, write an inequality, and solve each problem. Check your solution.

7. Forty is less than the difference of a number and 2.

$$\begin{array}{r} 40 < n - 2 \\ \quad +2 \quad +2 \\ \hline \end{array}$$

$$n > 42 \text{ or } \{n | n > 42\}$$

Check:

$$\text{if } n = 45$$

$$40 < 45 - 2$$

$$40 < 43 \checkmark$$

8. The sum of a number and 8 is less than 12.

$$\begin{array}{r} n + 8 < 12 \\ \quad -8 \quad -8 \\ \hline \end{array}$$

$$n < 4 \text{ or } \{n | n < 4\}$$

Check:

$$\text{if } n = 1$$

$$1 + 8 < 12$$

$$9 < 12 \checkmark$$

9. The sum of a number and 6 is greater than or equal to -4.

$$\begin{array}{r} n + 6 \geq -4 \\ \quad -6 \quad -6 \\ \hline \end{array}$$

$$n \geq -10 \text{ or } \{n | n \geq -10\}$$

check:

$$n = -8$$

$$-8 + 6 \geq -4$$

$$-2 \geq -4 \checkmark$$

5-2 Notes Solving Inequalities by Multiplication and Division

Solve Inequalities by Multiplication & Division: If each side of an inequality is multiplied or divided by the same positive number, the resulting inequality is also true. However, if each side of an inequality is multiplied or divided by the same negative number, the direction of the inequality must be reversed for the resulting inequality to be true.

Exercises

Solve each inequality. Check your solution.

1. $\frac{y}{6} \leq 2$
 $y \leq 12$
 check: $\frac{10}{6} \leq 2$ ✓
 $y = 10$

2. $2 - \frac{n}{50} > 22$
 $n < -1100$
 check: $2 - \frac{-1200}{50} > 22$
 $2 - (-24) > 22$
 $26 > 22$ ✓
 $n = -1200$

3. $3 \cdot \frac{3}{5}h \geq -3$
 $h \geq -5$
 check: $h = 10$
 $3 \cdot \frac{3}{5} \cdot 10 \geq -3$
 $18 \geq -3$ ✓

4. $25g \geq -100$
 $g \geq -4$

5. $30 < -3n$
 $-10 > n$
 $n < -10$

6. $-3 < \frac{p}{4} \cdot 4$
 $-12 < p$
 $p > -12$

Write an inequality and solve each problem. Check your solution.

7. Half of a number is at least 14.

$2 \cdot \frac{n}{2} \geq 14 \cdot 2$
 $n \geq 28$

8. One fifth of a number is at most 30.

$5 \cdot \frac{1}{5}n \leq 30 \cdot 5$
 $n \leq 150$

9. The opposite of three times a number is greater than 12.

$-3n > 12$
 $n < -4$

10. Negative five times a number is at most 100.

$-5n \leq 100$
 $n \geq -20$