

Solving Inequalities Using Addition and Subtraction

 Guide Notes

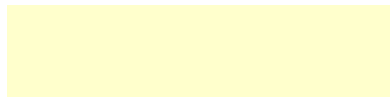
ADDITION PROPERTY OF INEQUALITIES

"If any number is added to each side of a true inequality, the resulting inequality is also true."

For all numbers a , b , and c , the following are true:

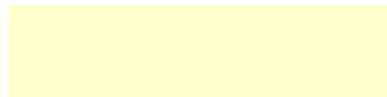
1. If $a > b$, then $a + c > b + c$.

$$\begin{array}{l} 11 > 8 \\ 11 + 2 > 8 + 2 \end{array}$$



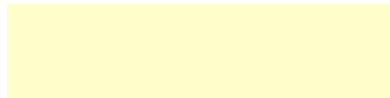
2. If $a < b$, then $a + c < b + c$.

$$\begin{array}{l} 15 < 21 \\ 15 + 5 < 21 + 5 \end{array}$$



3. If $a \geq b$, then $a + c \geq b + c$.

$$\begin{array}{l} 9 \geq 8 \\ 9 + 4 \geq 8 + 4 \end{array}$$



4. If $a \leq b$, then $a + c \leq b + c$.

$$\begin{array}{l} 13 \leq 14 \\ 13 + 3 \leq 14 + 3 \end{array}$$



Sample Problem 1: Solve each inequality.

A. $x - 6 \geq 4$

B. $z - 45 < 13$

C. $-4 > z - 8$

D. $-5 + n \leq 9$

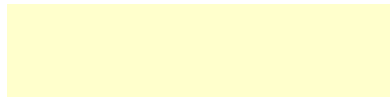
SUBTRACTION PROPERTY OF INEQUALITIES

"If any number is subtracted to each side of a true inequality, the resulting inequality is also true."

For all numbers a , b , and c , the following are true:

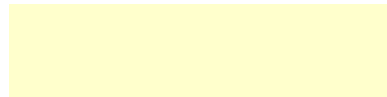
1. If $a > b$, then $a - c > b - c$.

$$\begin{array}{l} 12 > 7 \\ 15 + 5 > 7 + 5 \end{array}$$



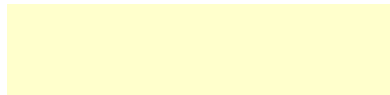
2. If $a < b$, then $a - c < b - c$.

$$\begin{array}{l} 16 < 20 \\ 16 + 3 < 20 + 3 \end{array}$$



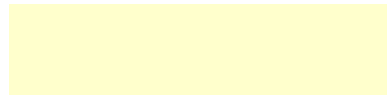
3. If $a \geq b$, then $a - c \geq b - c$.

$$\begin{array}{l} 8 \geq 7 \\ 8 + 2 \geq 7 + 2 \end{array}$$



4. If $a \leq b$, then $a - c \leq b - c$.

$$\begin{array}{l} 12 \leq 15 \\ 12 + 4 \leq 15 + 4 \end{array}$$



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Sample Problem 2: Solve each inequality.

A. $20 + x \geq 15$

B. $y + 5 < 22$

C. $19 > z + 8$

D. $x + 16 \leq 27$

Sample Problem 3: Solve each inequality.

A. $6 + x \geq 2x$

B. $2y < 13 + y$

C. $21 + 4z > 5z$

D. $3x \leq 27 + 2x$

Sample Problem 4: Write and solve an inequality.

A. Five times a number x plus seven is more than six times a number x .

B. Fifteen plus a number x is less than sixty.

C. Eleven is more than or equal to a number x minus three.

D. A number x plus twenty one is less than or equal to thirty.

Sample Problem 5: Write an inequality.

Ann ran a 5 kilometer race in 45 minutes. Write an inequality to describe the speeds of the runners who were faster than Ann.