

Solving Inequalities Using Multiplication or Division

 Guide Notes

MULTIPLICATION PROPERTY OF INEQUALITIES

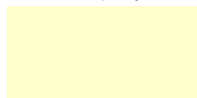
A. For multiplying a positive number

"If each side of a true inequality is multiplied by the **same positive number**, the resulting inequality is also true."

If ***a***, and ***b*** are any numbers and ***c*** is a positive number, the following are true:

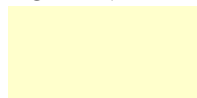
1. If $a > b$, then $ac > bc$.

$$\begin{array}{l} 12 > 9 \\ 12 \cdot 4 > 9 \cdot 4 \end{array}$$



2. If $a < b$, then $ac < bc$.

$$\begin{array}{l} 16 < 22 \\ 16 \cdot 2 < 22 \cdot 2 \end{array}$$



3. If $a \geq b$, then $ac \geq bc$.

$$\begin{array}{l} 10 \geq 9 \\ 10 \cdot 3 \geq 9 \cdot 3 \end{array}$$



4. If $a \leq b$, then $ac \leq bc$.

$$\begin{array}{l} 14 \leq 15 \\ 14 \cdot 5 \leq 15 \cdot 5 \end{array}$$



Sample Problem 1: Solve each inequality.

A. $\frac{x}{8} \geq 6$

B. $\frac{7}{5}a < -7$

C. $\frac{y}{4} \leq 13$

D. $\frac{2}{3}n > 4$

Solving Inequalities Using Multiplication or Division

 Guide Notes

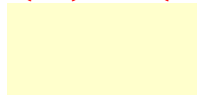
B. For multiplying a negative number

*"If each side of a true inequality is multiplied by the **same negative number**, the direction of the **inequality symbol must be reversed** so that the resulting inequality is also true."*

If ***a***, and ***b*** are any numbers and ***c*** is a negative number, the following are true:

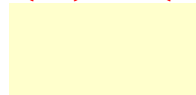
1. If $a > b$, then $ac < bc$.

$$\begin{array}{l} 15 > 12 \\ 15(-4) < 12(-4) \end{array}$$



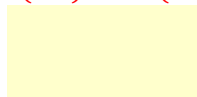
2. If $a < b$, then $ac > bc$.

$$\begin{array}{l} 19 < 25 \\ 19(-2) > 25(-2) \end{array}$$



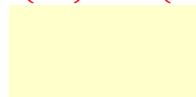
3. If $a \geq b$, then $ac \leq bc$.

$$\begin{array}{l} 13 \geq 12 \\ 13(-3) \leq 12(-3) \end{array}$$



4. If $a \leq b$, then $ac \geq bc$.

$$\begin{array}{l} 17 \leq 18 \\ 17(-5) \geq 18(-5) \end{array}$$



Sample Problem 2: Solve each inequality.

A. $-\frac{5}{6}x \leq -15$

B. $-\frac{2}{3}a > 18$

C. $-\frac{y}{5} \geq \frac{6}{5}$

D. $-\frac{n}{16} < \frac{3}{4}$

Sample Problem 3: Write and solve each inequality.

A. One-seventh times a number is at least 15.

B. The ratio of a number and 5 is more than 25.

C. A negative number over 15 is greater than or equal to 5.

D. A number divided by negative nine is less than or equal to negative two.

Solving Inequalities Using Multiplication or Division

 Guide Notes

DIVISION PROPERTY OF INEQUALITIES

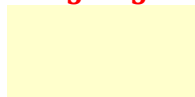
A. For dividing a positive number

*"If each side of a true inequality is divided by the **same positive number**, the resulting inequality is also true."*

If ***a***, and ***b*** are any numbers and ***c*** is a positive number, the following are true:

1. If $a > b$, then $\frac{a}{c} > \frac{b}{c}$.

$$\begin{array}{r} 12 > 9 \\ 12 & 9 \\ \hline 3 & 3 \end{array}$$



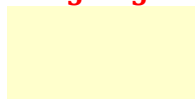
2. If $a < b$, then $\frac{a}{c} < \frac{b}{c}$.

$$\begin{array}{r} 16 < 22 \\ 16 & 22 \\ \hline 4 & 4 \end{array}$$



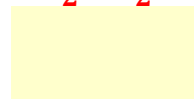
3. If $a \geq b$, then $\frac{a}{c} \geq \frac{b}{c}$.

$$\begin{array}{r} 10 \geq 9 \\ 10 & 9 \\ \hline 5 & 5 \end{array}$$



4. If $a \leq b$, then $\frac{a}{c} \leq \frac{b}{c}$.

$$\begin{array}{r} 14 \leq 15 \\ 14 & 15 \\ \hline 2 & 2 \end{array}$$



Sample Problem 4: Solve each inequality.

A. $4n \leq -12$

B. $15y > 90$

C. $3a \geq -57$

D. $2x < 5$

Solving Inequalities Using Multiplication or Division

 Guide Notes

B. For dividing a negative number

"If each side of a true inequality is divided by the **same negative number**, the direction of the **inequality symbol must be reversed** so that the resulting inequality is also true."

If ***a***, and ***b*** are any numbers and ***c*** is a negative number, the following are true:

1. If $a > b$, then $\frac{a}{c} < \frac{b}{c}$.

$$\begin{array}{r} 5 > 2 \\ 5 > 2 \\ \hline -3 < -3 \end{array}$$

2. If $a < b$, then $\frac{a}{c} > \frac{b}{c}$.

$$\begin{array}{r} 9 < 15 \\ 9 < 15 \\ \hline -4 > -4 \end{array}$$

3. If $a \geq b$, then $\frac{a}{c} \leq \frac{b}{c}$.

$$\begin{array}{r} 3 \geq 2 \\ 3 \geq 2 \\ \hline -5 \leq -5 \end{array}$$

4. If $a \leq b$, then $\frac{a}{c} \geq \frac{b}{c}$.

$$\begin{array}{r} 7 \leq 8 \\ 7 \leq 8 \\ \hline -2 \geq -2 \end{array}$$

Sample Problem 5: Solve each inequality.

A. $-2.4x \geq 3.6$

B. $-7a < 35$

C. $-3y \leq 7$

D. $-5n > 125$

Sample Problem 6: Write and solve each inequality.

A. Three times a number is less than or equal to 21.

B. The product of twenty five and a number is at most nine.

C. A negative number multiplied by six is greater than or equal to four.

D. Thrice a negative number is at least 18.