Solving Inequalities Using **Multiplication or Division**

Goal: Solve inequalities using multiplication and division.

Multiplication Properties of Inequality

Words

Multiplying each side of an inequality by a positive number produces an equivalent inequality.

Multiplying each side of an inequality by a negative number and reversing the direction of the inequality symbol produces an equivalent inequality.

Algebra

If 6x < 14, then

$$\left(\frac{1}{6}\right)(6x)$$
 $\left(\frac{1}{6}\right)(14)$.

If -3x < 15, then

$$\left(-\frac{1}{3}\right)(-3x)$$
 $\left[\left(-\frac{1}{3}\right)(15)\right]$

Solving an Inequality Using Multiplication

$$-\frac{1}{4}m \geq 6$$

 $\boxed{4} \cdot \left(-\frac{1}{4}\right) m \boxed{\leq} \boxed{4} \cdot 6$

Original inequality

Multiply each side by



Reverse | inequality symbol.

(Multipication property of inequality)

Simplify.

Division Properties of Inequality

Words

Dividing each side of an inequality by a positive number produces an equivalent inequality.

Dividing each side of an inequality by a negative number and reversing the direction of the inequality symbol produces an equivalent inequality.

Algebra

If 7x < 14, then

$$\frac{7x}{7} \boxed{ } \boxed{ \frac{14}{7}}.$$

If -2x < 8, then

$$\begin{bmatrix} -2x \\ 2 \end{bmatrix} > \begin{bmatrix} 8 \\ -2 \end{bmatrix}.$$

EXAMPLE 2 Solving an Inequality Using Division



Original inequality

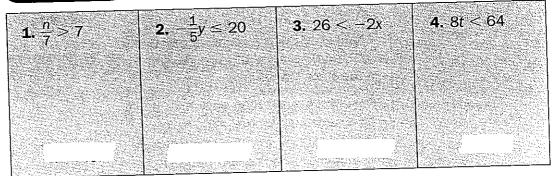
 $\begin{array}{c|c} 45 & & -9x \\ \hline -9 & & -9 \end{array}$

Divide each side by __9 . Reverse inequality symbol. (Division property of inequality)

-5 ≤ ×

Simplify.

Guided Practice Solve the inequality.



EXAMPLE 3 Using the Division Property of Inequality

Stock Market You want to buy shares of stock in a company. Each share of stock costs \$12.50. You can spend no more than \$325. Write and solve an inequality to find how many shares you can buy.

involving inequalities, Write an look for key phrases, Solution

When solving real

world problems

such as no more

than to determine what inequality

symbol to use.

Homework

Let s represent the number of shares you can buy.

Cost per share

Number of shares

≤ Amount can spend

12.5 s

[≦] 3

325

Write an algebraic model.

 $\frac{12.5s}{12.5} \le \frac{325}{12.5}$

Divide each side by 12.5

s ≤ 26

Simplify.

Answer You can buy no more than 26

shares.

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