Name _____ Date _____

2.3 Solving Inequalities Using Multiplication or Division

For use with Exploration 2.3

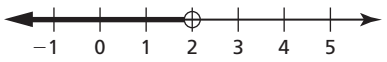
Essential Question How can you use division to solve an inequality?

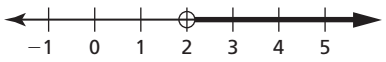
1 EXPLORATION: Writing a Rule

Work with a partner.

a. Complete the table. Decide which graph represents the solution of the inequality $6 < 3x$. Write the solution of the inequality.

x	–1	0	1	2	3	4	5
$3x$	–3						
$6 \stackrel{?}{<} 3x$	No						





b. Use a table to solve each inequality. Then write a rule that describes how to use division to solve the inequalities.

i. $2x < 4$

ii. $3 \geq 3x$

iii. $2x < 8$

iv. $6 \geq 3x$

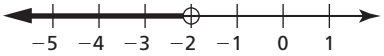
2.3 Solving Inequalities Using Multiplication or Division (continued)

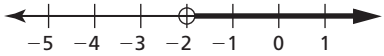
2 EXPLORATION: Writing a Rule

Work with a partner.

a. Complete the table. Decide which graph represents the solution of the inequality $6 < -3x$. Write the solution of the inequality.

x	-5	-4	-3	-2	-1	0	1
$-3x$							
$6 \stackrel{?}{<} -3x$							





b. Use a table to solve each inequality. Then write a rule that describes how to use division to solve the inequalities.

i. $-2x < 4$

ii. $3 \geq -3x$

iii. $-2x < 8$

iv. $6 \geq -3x$

Communicate Your Answer

3. How can you use division to solve an inequality?

4. Use the rules you wrote in Explorations 1(b) and 2(b) to solve each inequality.

a. $7x < -21$ **b.** $12 \leq 4x$ **c.** $10 < -5x$ **d.** $-3x \leq 0$

Name _____ Date _____

2.3 Notetaking with Vocabulary

For use after Lesson 2.3

Core Concepts

Multiplication and Division Properties of Inequality ($c > 0$)

Words Multiplying or dividing each side of an inequality by the same *positive* number produces an equivalent inequality.

Numbers

$-6 < 8$

$2 \cdot (-6) < 2 \cdot 8$

$-12 < 16$

$6 > -8$

$\frac{6}{2} > \frac{-8}{2}$

$3 > -4$

Algebra If $a > b$ and $c > 0$, then $ac > bc$. If $a > b$ and $c > 0$, then $\frac{a}{c} > \frac{b}{c}$.

If $a < b$ and $c > 0$, then $ac < bc$. If $a < b$ and $c > 0$, then $\frac{a}{c} < \frac{b}{c}$.

These properties are also true for $\leq$ and $\geq$.

Notes:

Multiplication and Division Properties of Inequality ($c < 0$)

Words When multiplying or dividing each side of an inequality by the same *negative* number, the direction of the inequality symbol must be reversed to produce an equivalent inequality.

Numbers

$-6 < 8$

$-2 \cdot (-6) > -2 \cdot 8$

$12 > -16$

$6 > -8$

$\frac{6}{-2} < \frac{-8}{-2}$

$-3 < 4$

Algebra If $a > b$ and $c < 0$, then $ac < bc$. If $a > b$ and $c < 0$, then $\frac{a}{c} < \frac{b}{c}$.

If $a < b$ and $c < 0$, then $ac > bc$. If $a < b$ and $c < 0$, then $\frac{a}{c} > \frac{b}{c}$.

These properties are also true for $\leq$ and $\geq$.

Notes:

2.3 Notetaking with Vocabulary (continued)

Extra Practice

In Exercises 1–8, solve the inequality. Graph the solution.

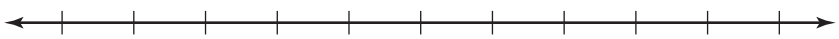
1. $6x < -30$

2. $48 \leq 16f$

3. $-\frac{6}{7} \leq \frac{3}{7}f$

4. $-4m \geq -16$

5. $\frac{x}{-6} > \frac{1}{3}$



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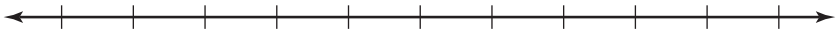
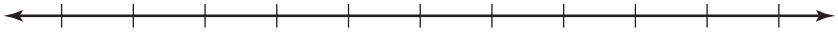
2.3 Notetaking with Vocabulary (continued)

6. $1 \leq -\frac{1}{4}y$



7. $-\frac{2}{3} < -4x$

8. $-\frac{4}{5}x \geq -2$



9. There are at most 36 red and blue marbles in a bag. The number of red marbles is twice the number of blue marbles. Write and solve an inequality that represents the greatest number of red marbles r in the bag.