6 - 7: Solve Inequalities by Multiplication or Division

Essential Question: WHAT DOES IT MEAN TO SAY TWO QUANTITIES ARE EQUAL?
At the end of the lesson, students should be able to answer, "When do you not reverse the inequality symbol when solving an inequality?"
Common Core: 7.EE.4, 7.EE.4b
Mathematical Practices: 1, 2, 3, 4, 7
Objective: solve inequalities by using the Multiplication or Division Properties of Inequality
Vocabulary: Multiplication Property of Inequality, Division Property of Inequality

I) Quick Review
　　Solve each inequality and graph the solution set on a number line.
1) $x - 15 > 3$
2) $g + 3 \leq -20$
3) $11 \geq t - 8$

II) What are we going to learn today?
1) To solve inequalities when multiplying or dividing by a positive number
2) To solve inequalities when multiplying or dividing by a negative number

III) Examples with positive coefficients
1) $8x \leq 40$

$$\frac{8x}{8} \leq \frac{40}{8}$$
$$x \leq 5$$

Check:
$4 \leq 5$
$8(4) \leq 40$
$32 \leq 40$ ✔

2) $30 < 5y$

$$\frac{30}{5} < \frac{5y}{5}$$
$$6 < y$$

Check:
$6 < 7$
$30 < 5(7)$
$30 < 35$ ✔

3) $7 < \frac{d}{2}$

$2(7) < (\frac{d}{2})2$

$14 < d$

Check:

14 ‹ 16

$7 < \frac{16}{2}$

7 ‹ 8 ✔

4) $\frac{h}{4} \leq 3$

$4(\frac{h}{4}) \leq (3)4$

$h \leq 12$

Check:

$8 \leq 12$

$\frac{8}{4} \leq 12$

$2 \leq 12$ ✔

IV) Examples with negative coefficients

1) $-2g < 10$

$\frac{-2g}{-2} < 10$

g ‹ -10

Check:

-20 ‹ -10

$-2(-20) < 10$

40 ‹ 10 ✗

So what do we do?!?!

When we multiply or divide both sides of an inequality by a negative number we switch the inequality!!

$$\frac{-2g}{-2} < 10$$

$$g > -10$$

Check:

$0 > -10$

$-2(0) < 10$

$0 < 10$ ✔

2) $4 \leq -4f$

$$\frac{4}{-4} \leq \frac{-4f}{-4}$$

$$-1 \geq f$$

Check:

$-1 \geq -2$

$4 \leq -4(-2)$

$4 \leq 8$ ✔

3) $\frac{p}{-3} \leq 4$

$$-3(\frac{p}{-3}) \leq (4)(-3)$$

$$p \geq -12$$

Check:

$0 \geq -12$

$\frac{0}{-3} \leq 4$

$0 \leq 4$ ✔

4) $-5 < \frac{n}{-4}$

$$-4(-5) < (\frac{n}{-4})(-4)$$

$$20 > n$$

Check:

$20 > 0$

$-5 < \frac{0}{-4}$

$-5 < 0$ ✔

V) Assessment

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Day 1
No Homework

Day 2
6-6 & 6-7. Keller

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