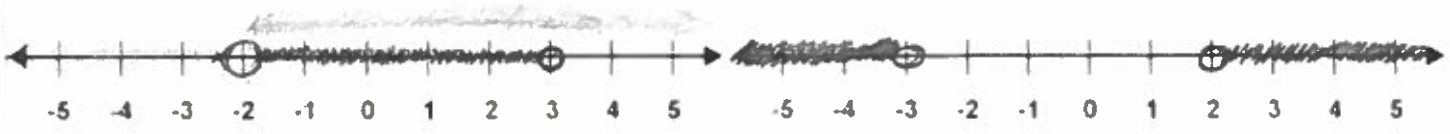
Name_____ Pd 1/2 Date November 6, 2017 **Section 1.D.8**

Compound Inequalities

A compound inequality is a mathematical statement using the words "and" or "or." You graph BOTH of the inequalities on the same number line. Try graphing these compound inequalities in your group.

$x < 3$ *and* $x > -2$ ✓ $x < -3$ *or* $x > 2$



"and" comes together "or" goes away.

Ex. 1 It's too cold to play basketball outside when the temperature, t, is less than 40 degrees. It's too hot to play basketball outside when the temperature, t, is greater than 100 degrees. Write and graph an inequality that represents the temperature outside...

when we CAN play basketball.

$t > 40$ and $t < 100$

when we CANNOT play basketball.

$t < 40$ or $t > 100$

Which inequality is an "and" inequality? Which inequality is an "or" inequality?

CAN CANNOT

There is a way to write an "and" compound inequality without using the word "and."

$m > -1$ *and* $m < 4$

$-1 < m < 4$

$n > -4$ *and* $n < 0$

$-4 < n < 0$

You Try 2 Write & graph the compound inequality. Your grade, g, must be at least 93 and no ~~less~~ more than 100 in order for you to have an A.

$g \geq 93$ and $g \leq 100$

$93 \leq g \leq 100$

You Try 3 Write & graph the compound inequality. All real numbers h that are less than 0 or greater than or equal to 5.

$h < 0$ or $h \geq 5$

$0 > h \geq 5$ - OK

Key Ideas

- The solution sets to "and" compound inequalities are In between two reference points.
- The solution sets to "or" compound inequalities go in opposite directions from the two reference points.
- Therefore, when we solve a compound inequality, we need to find both reference points.

Solving Compound Inequalities

Ex. 4A

$2 \le x - 5 < 10$

$2 \le x - 5$ and $x - 5 < 10$

$+5 \quad +5 \qquad +5 \quad +5$

$7 \le x \qquad x < 15$

$7 \le x$

Ex. 4B

$2 \le x - 5 < 10$

$+5 \quad +5 \quad +5$

$7 \le x < 15$

Key Idea

You can solve "and" inequalities by

(A) writing TWO different problems

(B) solving both sides of the inequality at the same time

and graph on the same number line.

Ex. 5

$3t + 2 < -7$ or $-4t + 5 < 1$

$-2 \quad -2 \qquad -5 \quad -5$

$\frac{3t}{3} < \frac{-9}{3} \qquad \frac{-4t}{-4} < \frac{-4}{-4}$

$t < -3 \qquad t > 1$

Ex. 6

$-3y < 6$ or $3 \cdot \frac{y}{3} \le -1 \cdot 3$

$\frac{-3y}{-3} > \frac{6}{-3} \qquad y \le -3$

$y > -2$

Key Idea

You solve "or" inequalities by doing TWO separate problems but still graphing on the same number line.

You Try 7 Solve & graph the compound inequality.

$2 < 8 + 3m < 5$

$-8 \quad -8 \quad -8$

$\frac{-6}{3} < \frac{3m}{3} < \frac{-3}{3}$

$-2 < m < -1$

You Try 8 Solve & graph the compound inequality.

$2x - 9 > -7$ or $7x + 5 \le -30$

$+9 \quad +9 \qquad -5 \quad -5$

$\frac{2x}{2} > \frac{2}{2} \qquad \frac{7x}{7} \le \frac{-35}{7}$

$x > 1 \qquad x \le -5$