Essential Question: How do we determine the solution set of a compound inequality?

Do Now: Determine whether each compound statement below is true or false.

a) Right now, I am in math class **or** English class. b) Right now, I am sitting **or** writing.

c) 5 > 1 or 6 < 3

d) 5 < 1 or 6 > 9

Think about this...

For any statements above that were determined to be true, what had to be true to make the statement true?

A number is a solution to a compound inequality connected by the word "OR" if the number is a solution to ______.



Let's look at some examples....

 To promote a new teen movie, the local movie theater is offering a discounted ticket rate for anyone who is under 7 years old **or** over 50 years old. Using *x* to represent the age of a discounted moviegoer, determine the solution set to the scenario described.



Examples: Graph the solution set to the following compound inequalities.

2. $x < 2 \text{ or } x \ge 4$

3. $x \ge 0$ or x < 5

Graphing "OR" Compound Inequalities

- Graph the first inequality on a number line
- Graph the second inequality on the same number line above the first inequality
- Graph the <u>combination</u> of both inequalities
- If the two graphs overlap, the solution set is all real numbers (a straight line)

More Examples:

4. *x* < -6 or *x* > 4

5. *x* > -6 or *x* < 4

6. $x \le -9 \text{ or } x > -3$

7. *x* < 10 or *x* > 10

8. 3*x* + 1 < 4 or 2*x* − 5 > 7

9. $2x \ge x - 3$ or 3x < x + 6

10. Write a compound inequality for the solution set shown below. Describe the solution set using interval notation.



11. Mercury is one of only two elements that is liquid at room temperature. Mercury is non-liquid for temperatures less than -38.0° F or greater than 673.8° F. Write a compound inequality for the temperatures at which mercury is non-liquid.

The AWAY	A solution to a compound inequality separated by the word "OR" is a		
TAKE	solution if it satisfies	,	
	The solution can also satisfy		
Turn and Talk:			
Consider the following o	ompound sentences:		
x < 1 and x > -1	x < 1 or x > -1		

Does changing the word from "**and**" to "**or**" change the solution set? Justify your response (*explain your reasoning and provide mathematical evidence*).

8 Algebra CC

USE A SEPARATE SHEET OF PAPER! For each compound inequality, represent the solution set using a graph and *interval notation*. Use a straight edge to make your graphs.

1. $x \ge -3$ and $x < 2$	2. $-5 \le x \le 4$	3. $x \le -1$ and $x > 7$
43 <i>x</i> < 36 and <i>x</i> + 3 < -1	5. $x \ge -5$ or $x < 3$	6. <i>x</i> < 0 or <i>x</i> > 6

7. 4x - 1 < 7 or 2x > 16

Write a compound inequality to represent each situation below.

- 8. Write a compound inequality to represent the scenario. You'll need to bring at least \$15 to the movies but you won't need more than \$25. Let **m** represent the money brought to the movies
- 9. In order to participate in the big buddy/little buddy bowling league, you must be over 18 years of age or under 10 years of age.

Let **p** represent the age of a participant

- 10. Unsafe body temperatures are those lower than 96° F or above 104° F. Let **t** represent an unsafe body temperature
- 11. A survey showed that 92% of students always do their homework. If the margin of error of the data is plus or minus 3.5%, write a compound inequality that represents the percentage of students, x, who always do their HW.







HW #_