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 " $O R$ " if the number is a solution to $\qquad$ .

## Let's look at some examples....

1. 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 $\boldsymbol{x}$ 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. $x<2$ or $x \geq 4$
3. $x \geq 0$ 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 combination 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. $x \leq-9$ or $x>-3$
6. $3 x+1<4$ or $2 x-5>7$
7. $x>-6$ or $x<4$
8. $x<10$ or $x>10$
9. $2 x \geq x-3$ or $3 x<x+6$
10. Write a compound inequality for the solution set shown below. Describe the solution set using interval notation.


$$
\begin{array}{lllllllll}
-4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4
\end{array}
$$

Interval: $\qquad$
The symbols $\vee$ or $\cup$ can be used to represent the word
11. Mercury is one of only two elements that is liquid at room temperature. Mercury is non-liquid for temperatures less than $-38.0^{\circ} \mathrm{F}$ or greater than $673.8^{\circ} \mathrm{F}$. Write a compound inequality for the temperatures at which mercury is non-liquid.
 A solution to a compound inequality separated by the word "OR" is a solution if it satisfies $\qquad$ .

The solution can also satisfy .

## Turn and Talk:

Consider the following compound sentences:
$\mathrm{x}<1$ and $\mathrm{x}>-1$

$$
x<1 \text { or } x>-1
$$



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

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. $x \geq-3$ and $x<2$
2. $-5 \leq x \leq 4$
3. $x \leq-1$ and $x>7$
4. $-3 x<36$ and $x+3<-1$
5. $x \geq-5$ or $x<3$
6. $x<0$ or $x>6$
7. $4 x-1<7$ or $2 x>16$

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 $\boldsymbol{m}$ 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 prepresent the age of a participant

10. Unsafe body temperatures are those lower than $96^{\circ} \mathrm{F}$ or above $104^{\circ} \mathrm{F}$. Let trepresent 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, $\boldsymbol{x}$, who always do their HW.


