Name_____Solving and Graphing Inequalities on the Number line Guided Notes/Study Guide
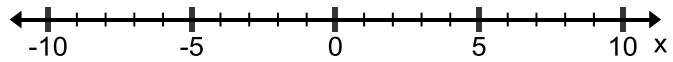
SOLVE each the following inequalities   Graph each of the following on the number lines provided below

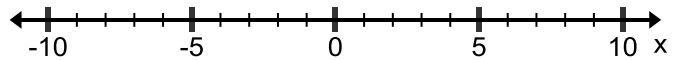BE CAREFUL WITH SIGNS AND TYPES OF "DOTS"   LABEL ANY NECESSARY POINTS ON THE NUMBER LINE

1.

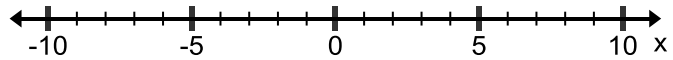$$8x+4<-28$$

2.

$$-5x+4\geq-6$$
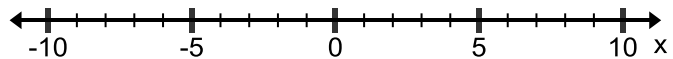

3.

$$\frac{5}{2}x+4\leq-11$$

4.

$$-23<5-7x$$

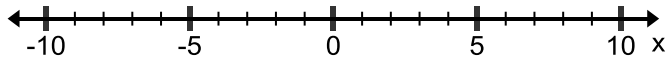Graph each of the following on the number lines provided below
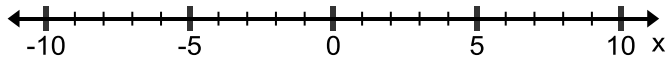
5.

$x < -2$ or $x \geq 5$
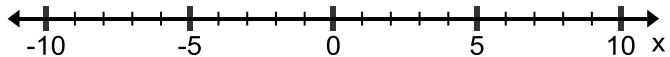
$$\xleftarrow{\quad\underset{-10}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{-5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{0}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{10}{\rule[-0.3em]{0.02em}{0.8em}}\quad}\rightarrow\ \text{x}$$

6.

$x \leq -4$ and $x \geq -6$

$$\xleftarrow{\quad\underset{-10}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{-5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{0}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{10}{\rule[-0.3em]{0.02em}{0.8em}}\quad}\rightarrow\ \text{x}$$

7.

$-6 \leq x < 4$

$$\xleftarrow{\quad\underset{-10}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{-5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{0}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{10}{\rule[-0.3em]{0.02em}{0.8em}}\quad}\rightarrow\ \text{x}$$
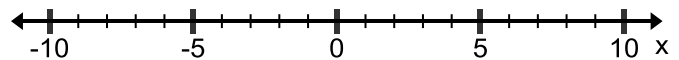
SOLVE each the following inequalities   Graph each of the following on the number lines provided below

BE CAREFUL WITH SIGNS AND TYPES OF "DOTS"   LABEL ANY NECESSARY POINTS ON THE NUMBER LINE
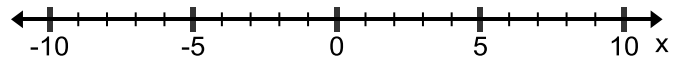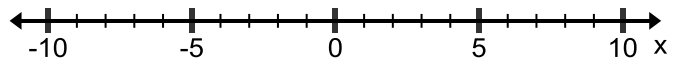
8.

$2x + 4 < -4$ or $3x - 15 \geq 12$

$$\xleftarrow{\quad\underset{-10}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{-5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{0}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{10}{\rule[-0.3em]{0.02em}{0.8em}}\quad}\rightarrow\ \text{x}$$

9.

$-20x + 40 \geq -80$ and $2x - 9 > -16$

$$\xleftarrow{\quad\underset{-10}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{-5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{0}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{5}{\rule[-0.3em]{0.02em}{0.8em}}\qquad\underset{10}{\rule[-0.3em]{0.02em}{0.8em}}\quad}\rightarrow\ \text{x}$$

10.

$$-4 > \frac{5}{2}x + 4 \geq -11$$

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←+++++++++++++++++++++++++++++++++++++→
      -10        -5         0         5        10  x
```

11.

$$2 < |4x - 12|$$

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←+++++++++++++++++++++++++++++++++++++→
      -10        -5         0         5        10  x
```
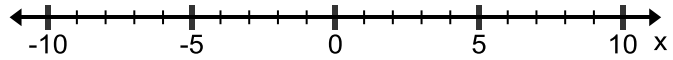
Solve and Graph the following on the given number lines

12. $|5x - 15| = 20$

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←+++++++++++++++++++++++++++++++++++++→
      -10        -5         0         5        10  x
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13. $|2x - 4| < 2$

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←+++++++++++++++++++++++++++++++++++++→
      -10        -5         0         5        10  x
```

$$\left|\frac{-1}{2}x + 1\right| \geq 4$$

14.

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←+++++++++++++++++++++++++++++++++++++→
      -10        -5         0         5        10  x
```
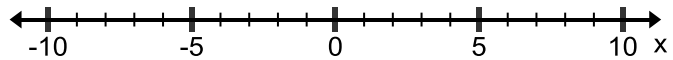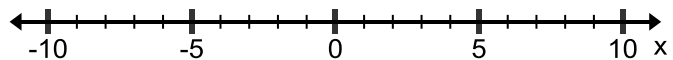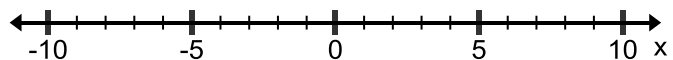
15. Give a compound inequality that NO solutions

16. Give an absolute value inequality that has all real numbers as a solution

Suggestions to avoid errors with inequality

17. Understand and be able to state the 4 different reasons an inequality would "change"
    a. Multiply by a negative in the solution process
    b. Divided by a negative in the solution process
    c. Rewrite a single inequality in the "opposite" direction
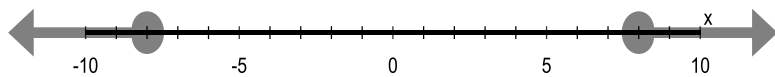   d. Rewrite an absolute value as a compound inequality

18. KNOW THE TYPES OF GRAPHS AND "DOTS" TO USE in the graphing of the solution set of compound inequalities
    You should be able to match the inequalities below with their graphs
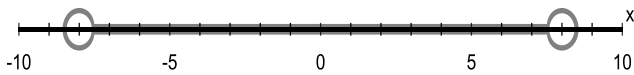   e. $x = 8 \text{ OR } x = -8$ GRAPH 1
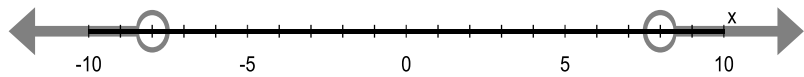
    f. $x > 8 \text{ OR } x < -8$ GRAPH 2
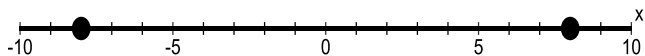

    g. $x < 8 \text{ AND } x > -8$ GRAPH 3
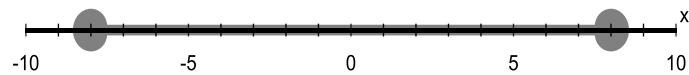
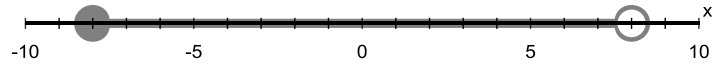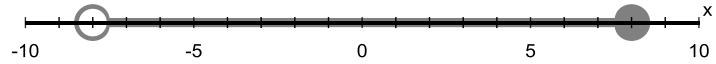   h. $x \leq 8 \text{ AND } x \geq -8$ GRAPH 4

    i. $x \geq 8 \text{ OR } x \leq -8$ GRAPH 5

19. KNOW THE TYPES OF GRAPHS AND "DOTS" TO USE in the graphing of the solution set of compound inequalities

You should be able to match the inequalities below with their graphs
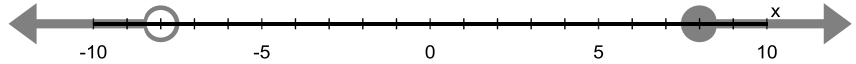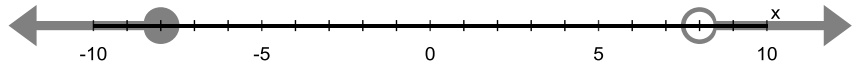
     a. $x < 8$ OR $x > -8$ GRAPH 1

     b. $x \geq 8$ OR $x < -8$ GRAPH 2

     c. $x \geq 8$ AND $x < -8$ GRAPH 3

     d. $x < 8$ AND $x \geq -8$ GRAPH 4

     e. $x > 8$ OR $x \leq -8$ NO SOLUTIONS WORK FOR THIS COMPOUND INEQUALITY

     f. $x \leq 8$ AND $x > -8$ ALL SOLUTIONS WORK FOR THIS COMPOUND INEQUALITY

20. Which of the following is true about an AND STATEMENT
     a.   AND statements CAN have solutions, but IF the right conditions exist
     b.   AND statements can have NO SOLUTIONS if the right conditions exist
     c.   AND statements ALWAYS have solutions
     d.   AND statements can have EVERY solution as a solution set if the right conditions exist

21. Which of the following is true about an OR STATEMENT
     a.   OR statements CAN have solutions, but IF the right conditions exist
     b.   OR statements can have NO SOLUTIONS if the right conditions exist
     c.   OR statements ALWAYS have solutions
     d.   OR statements can have EVERY solution as a solution set if the right conditions exist

22. KNOW THE TYPES OF GRAPHS AND "DOTS" TO USE in the graphing of the solution set of absolute value
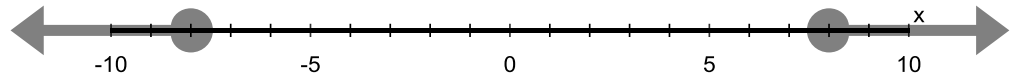   You should be able to match the inequalities below with their graphs
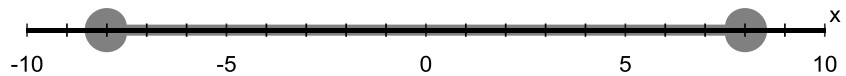
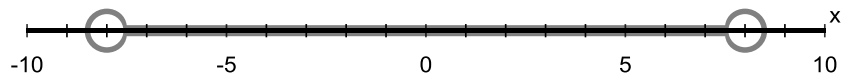   g. $|x|=8$ GRAPH 1
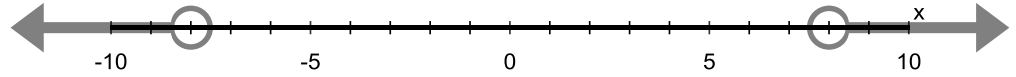
    h. $|x|\geq 8$ GRAPH 2

    i. $|x|<8$ GRAPH 3

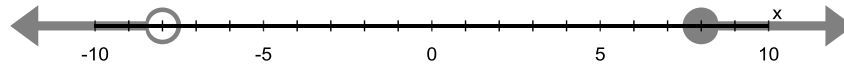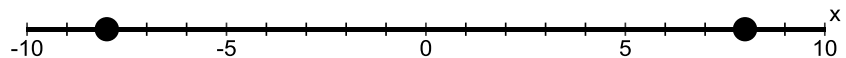   j. $|x|>8$ GRAPH 4

    k. $|x|\leq 8$ GRAPH 5

23. Bob states that   could be a solution
    set to an absolute value inequality.
        a. State whether or not you agree with Bob and support your choice