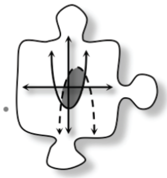
CW#___ Name:_______________________________

Period: A1 A2 A3 B1 B3

3.2.1 How can I solve inequalities?



With Major Edits. 😆

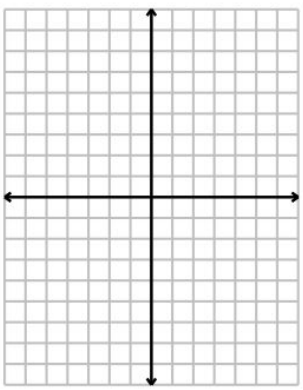
Solving Inequalities with One or Two Variables

REVIEW: Solving by Graphing.

i. $4|x+1|-2=6$

Graph:

$y=$ $y=$



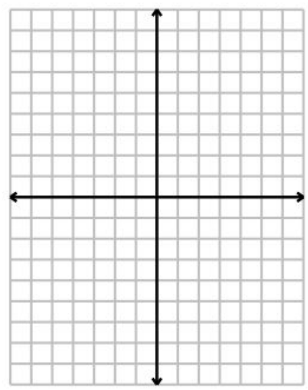
Points of intersection:

Solutions of $4|x+1|-2=6$:

ii. $x+3=x^2+3$

Graph:

$y=$ $y=$



Points of intersection:

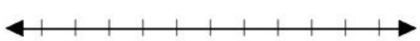
Solutions of $x+3=x^2+3$:

#1 Consider the <u>inequality</u> $4|x+1|-2>6$.

Solve the <u>equation</u> algebraically:

$4|x+1|-2=6$

a. How many boundary points will the <u>inequality</u> $4|x+1|-2>6$ have? How does the <u>equation</u> above help you figure this out? Mark the boundary points on a number line.



b. Which portion(s) of the number line contain the solutions for this <u>inequality</u>?

Use the <u>inequality</u> to test a value in each region. Represent the solutions algebraically and on a number line.

#2 Solve $x + 3 \geq x^2 + 3$. Represent the solutions on a number line.

a. Solve for the boundary points.

b. Graph the boundary points:

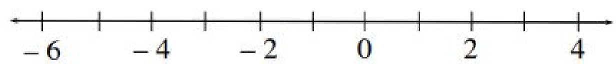
c. Test each region. Then shade the solution region(s).

d. Express the solutions with numbers and symbols.

#3 Solve $2x^2 + 5x - 3 \leq x^2 + 4x + 3$. Represent the solutions with numbers and symbols and on a number line.

a. Solve for the boundary points.

b. Graph the boundary points:



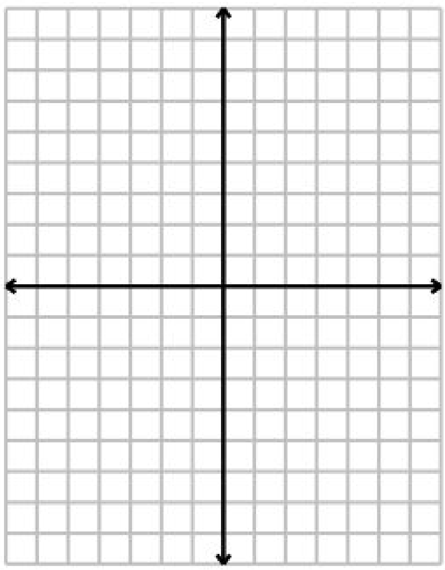
c. Test each region. Then shade the solution region(s).

d. Express the solutions with numbers and symbols.

#4 Solve $|2x - 7| + 1 \leq 20$. Represent the solutions with numbers and symbols and on a number line.

#5 Consider the <u>inequality</u> $y > x + 3$.

a. Graph the related <u>equation</u> $y = x + 3$



b. The line divides the graph into two regions. Select 2 points on each side of the line. Check to see if these points are solutions of the <u>inequality</u> by substituting them to see if they make the inequality true.

c. Then shade that region of the graph.

d. Using the <u>inequality</u>, test the points (-3, 0) and (1, 4). Are these solutions of the <u>inequality</u>?

e. Re-draw the line so that it represents the <u>inequality</u> and the fact that points on the line are not solutions of the <u>inequality</u>.

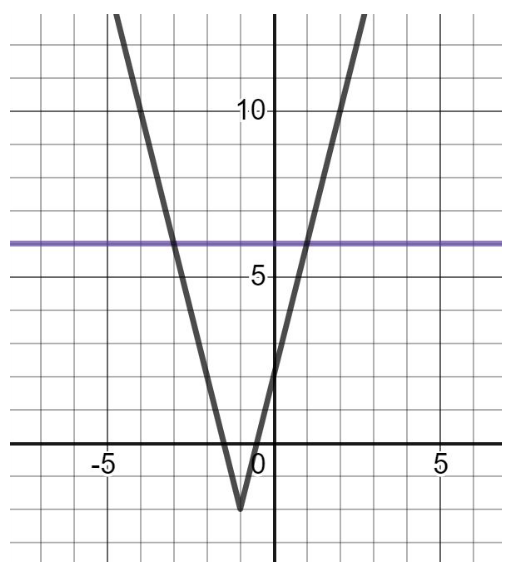
#6 Bert and Ernie used the system of equations at right to solve the equation $4|x+1|-2=6$.

a. What <u>system of equations</u> did they graph? (You graphed these on the first page.) Label the graph with their equations.

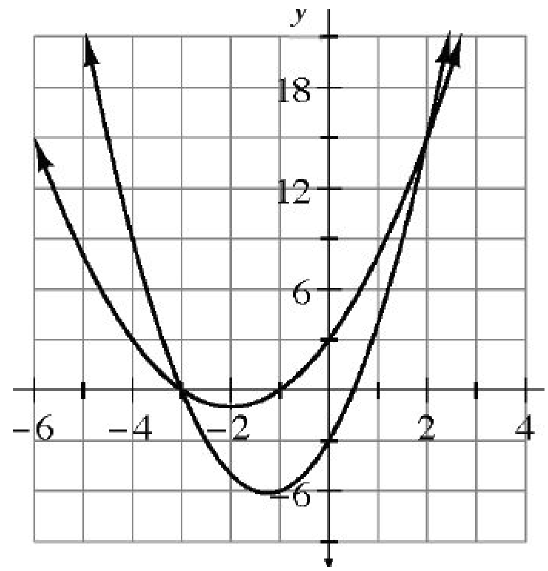
$y =$ $\qquad\qquad$ $y =$

b. Bert started doodling and shaded in the triangle-shaped region between the linear function and the absolute value function. Shade that region now.

"Could we turn these equations into inequalities that represent this shaded region?" he thought. Help Bert decide which type of symbols to use and which way they should face so you can turn the equations into a <u>system of inequalities</u>.



#7 The graphs of $y = 2x^2 + 5x - 3$ and $y = x^2 + 4x + 3$ are shown at right.



a. Discuss with your team which equation represents which curve. Label each curve with its equation.

b. Is (0,0) a solution of the <u>inequality</u> $y \le x^2 + 4x + 3$? How about (-2,0)? Show how you know by substituting the point into the inequality.

❑ Shade the "solution region."

c. Is (0,0) a solution of the <u>inequality</u> $y \le 2x^2 + 5x - 3$? How about (3,0)? Show how you know by substituting the point into the inequality.

❑ Shade the "solution region."

d. Which region represents the solution region of the <u>system of inequalities</u> below?

$$y \le 2x^2 + 5x - 3$$
$$y \le x^2 + 4x + 3$$

#8 Graph the System of Inequalities. Shade the solution region. Show or explain how you know that the solution region is correct.

$$y < \tfrac{3}{5}x - 2$$
$$y \ge -(x+1)(x-6)$$