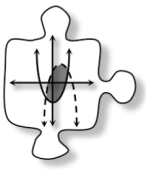
CW#___ Name:_____

3.2.1 How can I solve inequalities?

Solving Inequalities with One or Two Variables



#68 Consider the inequality $4|x+1|-2>6$.

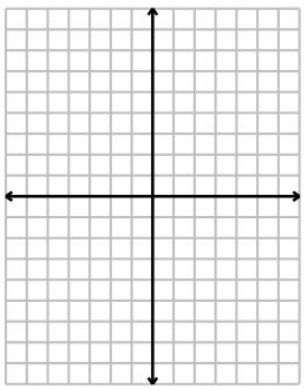
a. How many boundary points are there? What are they? Should they be marked with filled or unfilled circles? Mark the boundary points on a number line.

b.Which portion(s) of the number line contain the solutions for this inequality? How many regions do you need to test? Represent the solutions algebraically and on a number line.

#70 Next, Bert and Ernie work on solving the inequality $4|x+1|-2>6$ from problem #68. This time, Ernie had an idea. *"Why don't we solve this by graphing a system of equations as we did in problem 3-67?"*.

a. What system of equations should they graph?

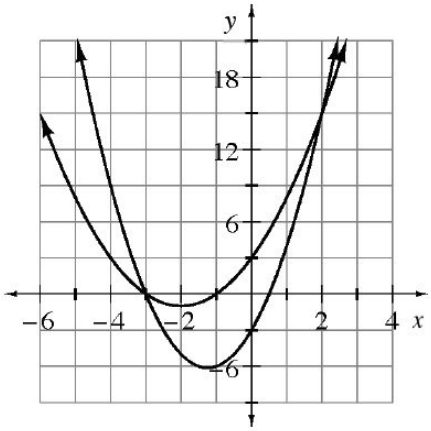
b. Make a complete graph of the system. **(scale by ones)**



Explain how you can use the graph to solve

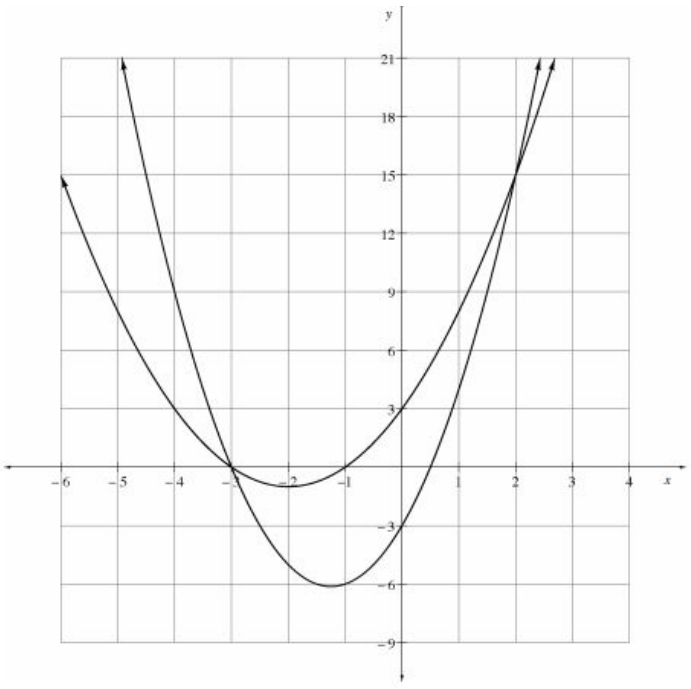
$4|x+1|-2>6$.

#67 In the previous section, you learned how to use the graph of a system to solve an equation. How can the graphs of
$y = 2x^2 + 5x - 3$ and $y = x^2 + 4x + 3$ (shown at right) help you solve an *inequality*? Consider this as you complete the parts below.

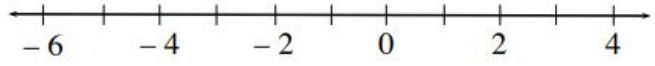


a. How can you use the graph to determine the solutions to $2x^2 + 5x - 3 = x^2 + 4x + 3$? What are the solutions?

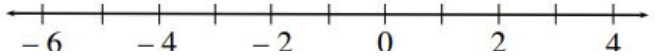
b.Below label each graph with its equation and highlight each function with a different color. How did you decide which graph matches which function?



$2x^2+5x-3\leq x^2+4x+3$



$2x^2+5x-3>x^2+4x+3$



c. Use the graph to identify the x-values for which $2x^2 + 5x - 3 \leq x^2 + 4x + 3$. How did you locate the solutions? How many solutions are there? How can you describe all of the solutions?

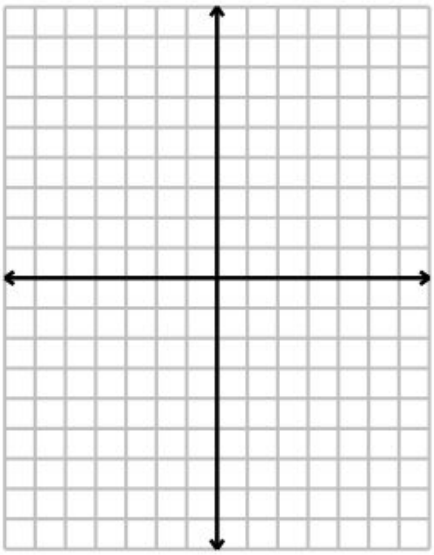
d. How can these solutions be represented on a number line? Locate the number line labeled $2x^2 + 5x - 3 \leq x^2 + 4x + 3$. Use a colored marker to highlight the solutions to the inequality on the number line. Then write the solutions algebraically below

e. What about the inequality $2x^2 + 5x - 3 > x^2 + 4x + 3$? What are the solutions to this inequality? Represent your solutions algebraically and on a number line.

#69 Bert and Ernie are solving the inequality $2x^2 + 5x - 3 < x^2 + 4x + 3$. They are looking at the graph in problem 3-67 when Bert has an idea. "*Can't we change this into one parabola and solve our inequality that way?*", he asks. Ernie asks, "*What do you mean?*"
"*Can't we determine the solutions by looking at the graph of* $f(x) = x^2 + x - 6$*?*", Bert replies.

a. Where does Bert get the equation $f(x) = x^2 + x - 6$?

b. Try Bert's idea. Make a sketch of the parabola.



How can the parabola be used to solve the original inequality?

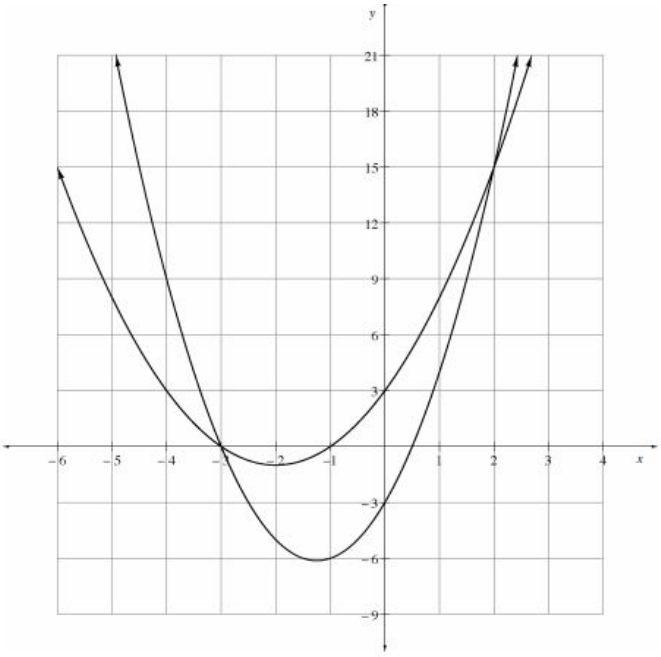
c. *" Instead of graphing the parabola, can't we just rewrite the new inequality as* $x^2 + x - 6 < 0$ *and then solve the equation* $x^2 + x - 6 = 0$*? This would give us the boundary points and then we could test numbers in the original inequality to see the regions that contain the solutions."* Use Ernie's method to solve the inequality. Does it give the same solution?

d. Use any method to solve the inequality $x^2 - 3x - 10 \geq 0$.

#71 Now consider the system of inequalities with two variables (x and y) below.

$$y \geq 2x^2 + 5x - 3$$
$$y < x^2 + 4x + 3$$

Use two colors to identify which parabola belongs to each inequality. Use a solid line or a dotted line when appropriate.



a. Which points make both inequalities true? For example, does the point (–3, 0) make both inequalities true? What about (–1, 1)? (1, 5)?

b. What is the difference between a solution to the *system* of inequalities above and a solution to the inequality in problem #67?

c. How are the graphs of the equations $y = 2x^2 + 5x - 3$ and $y = x^2 + 4x + 3$ related to the graph of the system of inequalities?

d. How can you represent all of the solutions to the system of inequalities?