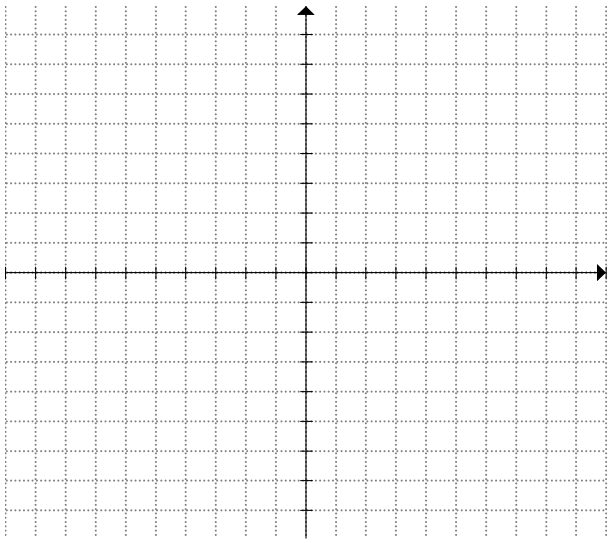
Name:_____ Date:_____

HW Section 1.3 Solving Systems with Two or More Absolute Value Functions:

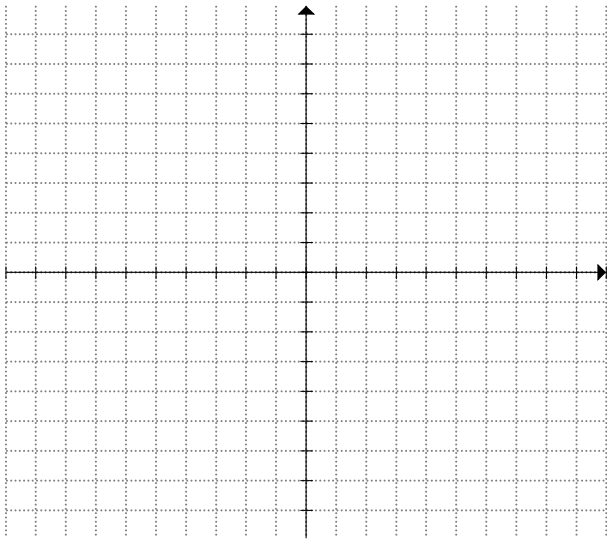
1. Graph each of the Absolute Value functions below and then state the Piece Wise Function

a) $y = \left|(x-4)^2 - 5\right|$



PIECE -WISE :

b) $y = \frac{1}{2}\left|(x-4)(x+2)\right|$

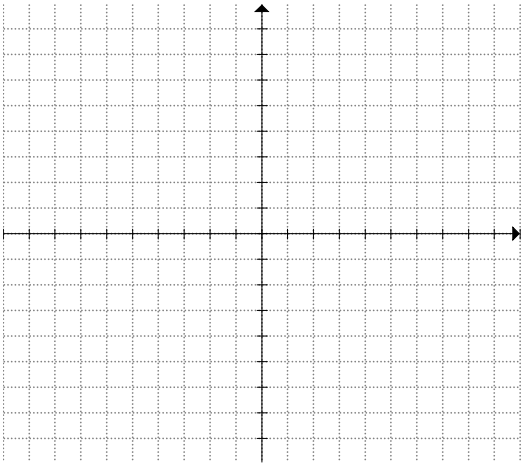


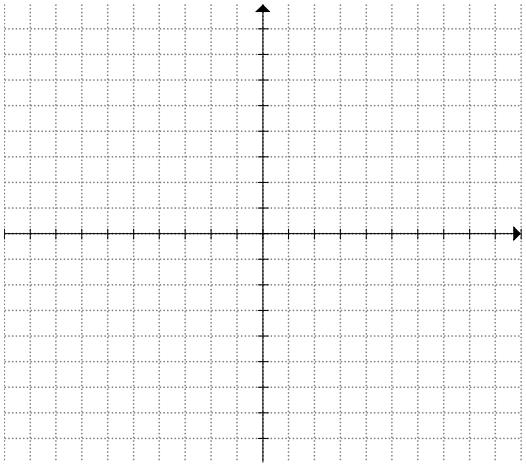
PIECE -WISE :

2. Solve the equation and indicate if there are any extraneous roots. Indicate the number of solutions. Graph the system using the graph below.

a) $\left|x^2 - 6x + 5\right| = x - 1$

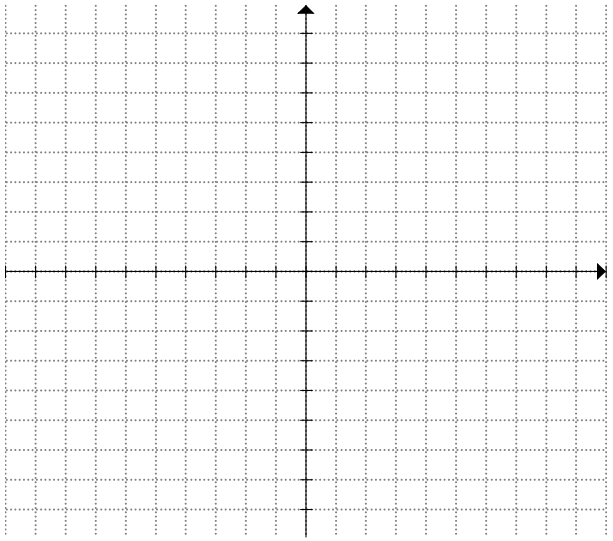
b) $\left|x^2 - 4x - 4\right| = 2x - 1$





3. Given each equation, indicate how you will separate "y1" and "y2". Then graph each function separately to find the intersection point:

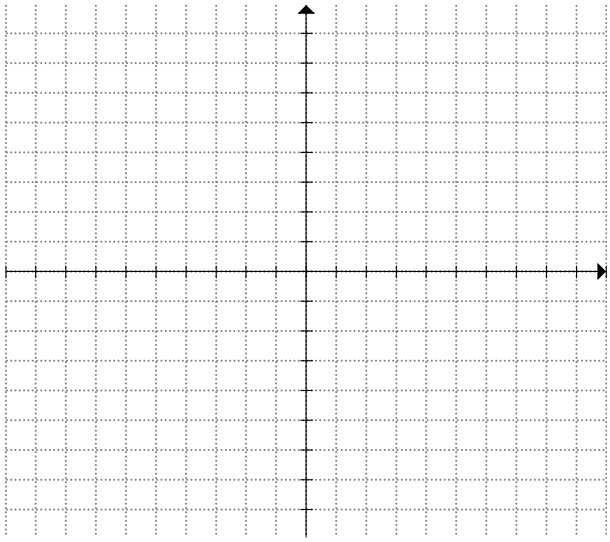
a) $|x-3|-|x+4|=4$



Y1: Y2:

Intersection Points:

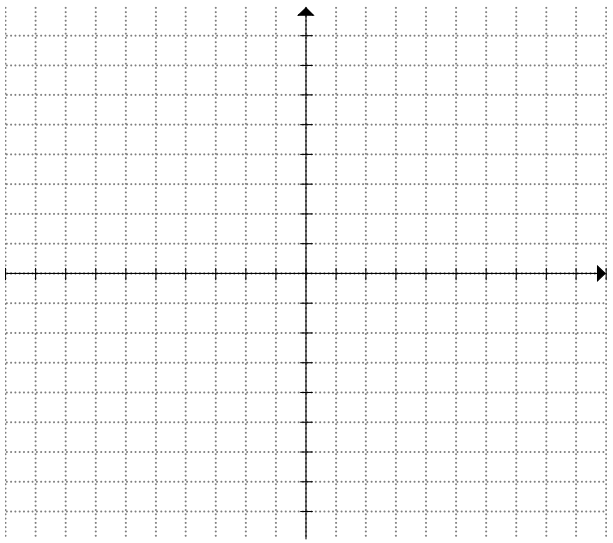
b) $|x+2|-|x-3|+1=0$



Y1: Y2:

Intersection Points:

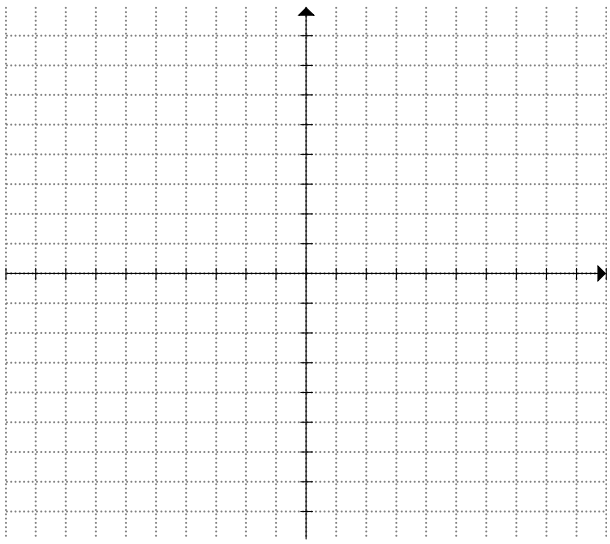
c) $|x-3|+|x-2|=4$



Y1: Y2:

Intersection Points:

d) $|2x-3|+|x+2|-4=0$



Y1: Y2:

Intersection Points:

4. Solve the following equations algebraically and then indicate any extraneous roots:

e) $\lvert x+3\rvert+\lvert x-6\rvert=16$	f) $\lvert x+3\rvert+\lvert 5-x\rvert=16$
g) $\lvert 2x+1\rvert+\lvert 4-3x\rvert=18$	h) $\lvert 3x-1\rvert+\lvert 3x-5\rvert=-4$
i) $\lvert 2x+3\rvert+\lvert 4-3x\rvert=15$	j) $\lvert 2x+3\rvert+\lvert 3x-8\rvert=15$

5. Given the following equation, is the solution a set of points or a range of values? Explain:
$|2x-1|+|2x-5|-4=0$

6. Find all the value(s) of "x" for which the equation is true: $|x|=|x+1|$

7. Find the two value(s) that will satisfy the equation: $|x-1|+|x|+|x+1|=\frac{5}{2}$

8. Solve for "x" $|x^2-9x+20|=|16-x^2|$

9. How many ordered pairs of integers (a,b) satisfy this equation? $|a-2|\times|b-3|=2$

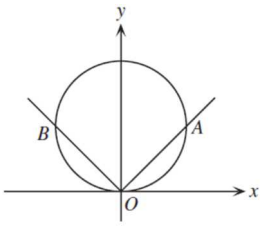
10. What is the smallest value of "x" such that $|5x-1| = |3x+2|$? Express your answer as a common fraction

11. For what values of "k" will the equation have infinite solutions?
$|2x+3|+k = -|2x+7|+11$

12. For what values of "k" will the equation have infinite solutions?
$|3x+k|-7 = -|3x+7|+11$

13. Solve: $|3x+13|-7 \geq 2x$

14. A circle with its center on the y-axis intersects the graph of $y = |x|$ at the origin and exactly two other points "A" and "B" as shown in the diagram below. Prove that the ratio of the area of triangle ABO to the area of the circle is always $1:\pi$



15. What is the value of $b > 0$ for which the region bounded by both equations has an area of 72? $y = 0$ and $y = -|2x| + b$?

16. Challenge: Positive integers "a", "b", and "c" are chosen so that $a < b < c$, and the system of equation: $2x + y = 2003$ and $y = |x - a| + |x - b| + |x - c|$ has exactly one solution. What is the minimum value of "c"? Amc 2003 #24