3.2 Absolute Value Graphs

NOTES

Write your questions here!

PARENT FUNCTION

$$y = |x|$$

Translation

Move it up 3.	Move it down 5.	How does this move it? $y = \|x + 2\|$
How does this move it? $y = \|x - 6\|$	Move it right 3 and up 5	Move it left 4 and down 5

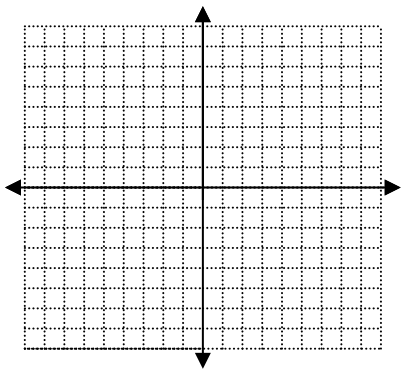
Reflection

$y = |x|$

x	y
-2	
-1	
0	
1	
2	

$y = -|x|$

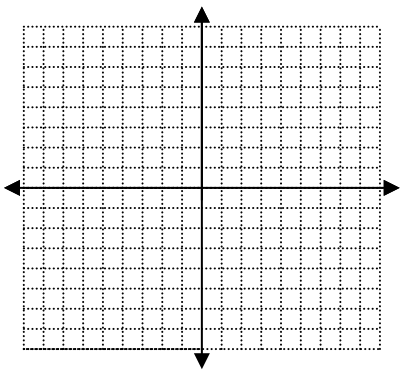
x	y
-2	
-1	
0	
1	
2	



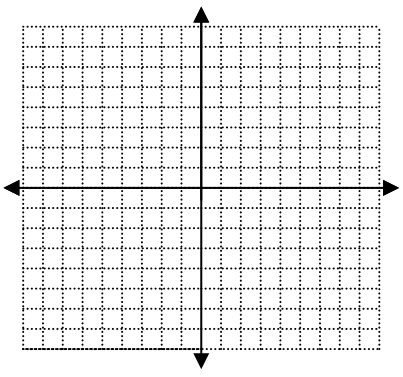
Move it left 4 up 3 and flip it.

Transformation

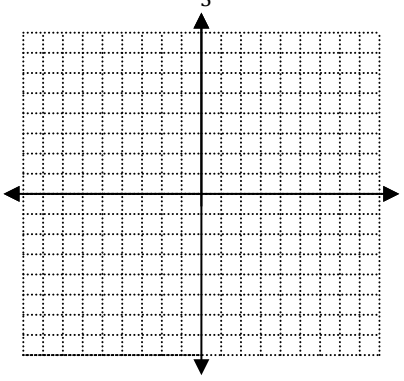
$y = |x|$



$y = 3|x|$



$y = \frac{2}{5}|x|$

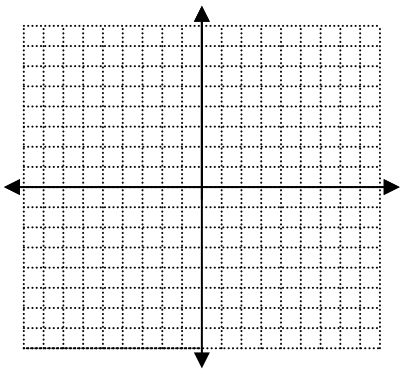


General Equation of an Absolute Value Function

$$y = a|x - h| + k$$

TRY IT!

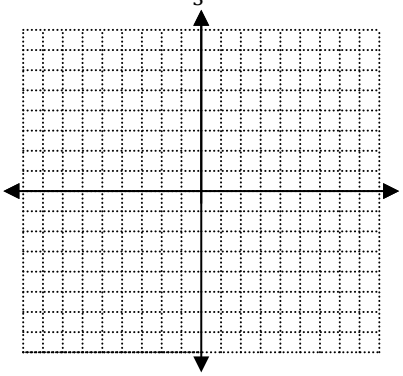
$y = 2|x - 5| + 2$



Domain =

Range =

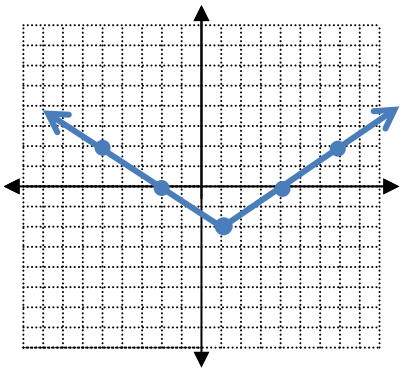
$y = -\frac{2}{3}|x| + 3$



Domain =

Range =

$y =$

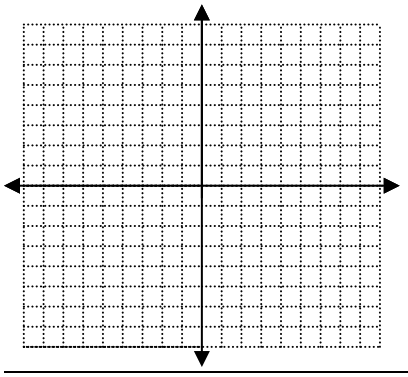


Domain =

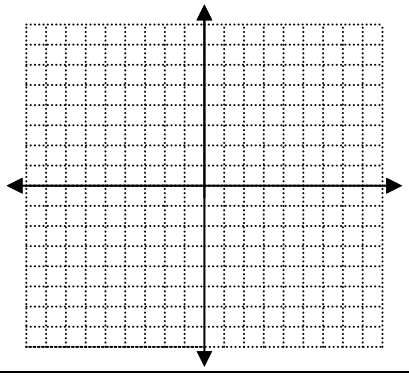
Range =

Graphing Inequalities

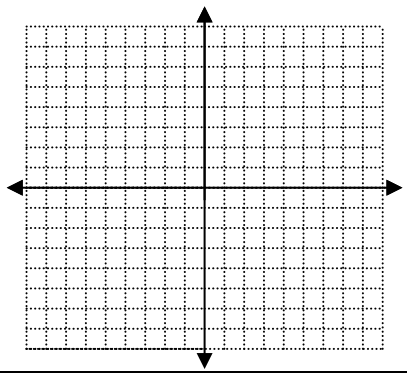
$y < 2x + 1$



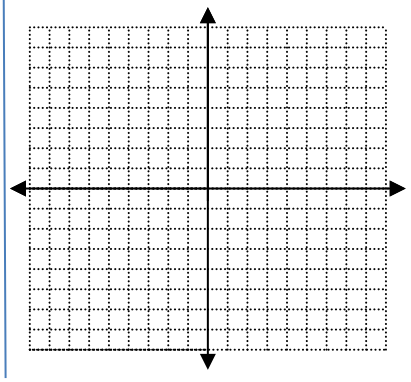
$-2y \leq 3x - 4$



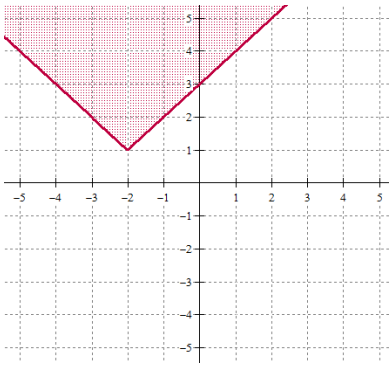
$y < \frac{3}{4}|x - 2|$



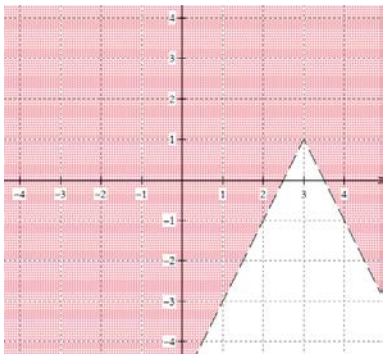
$y \geq -2|x + 3| - 1$



y



y



SUMMARY:

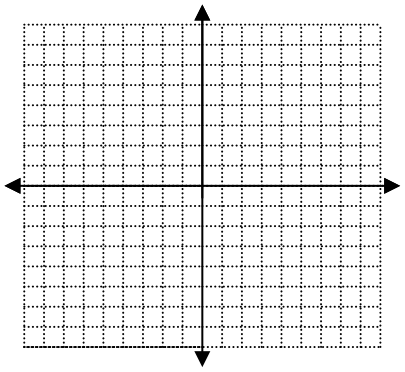
Now, summarize your notes here!

3.2 Absolute Value Graphs

PRACTICE

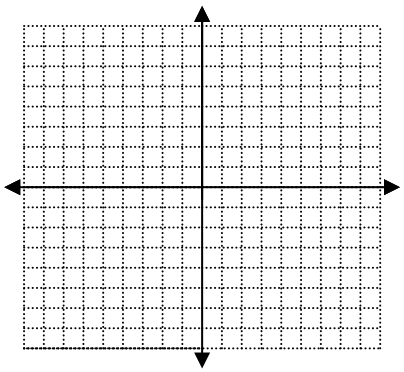
Graph the following absolute value functions. State the range.

1. $y = |x - 3| - 4$



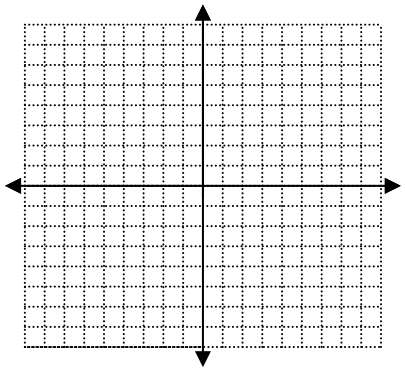
Range =

2. $f(x) = \frac{3}{4}|x + 2| - 1$



Range =

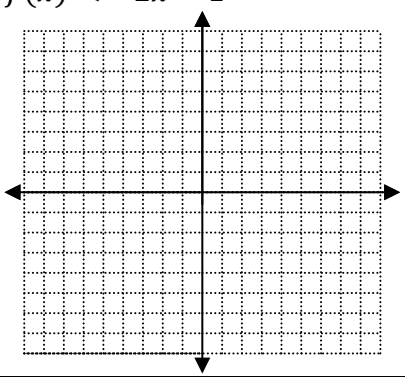
3. $y = -3|x - 1|$



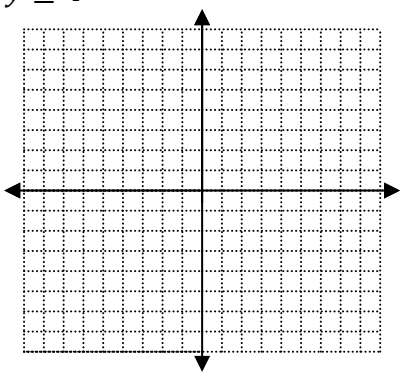
Range =

Graph the following inequalities.

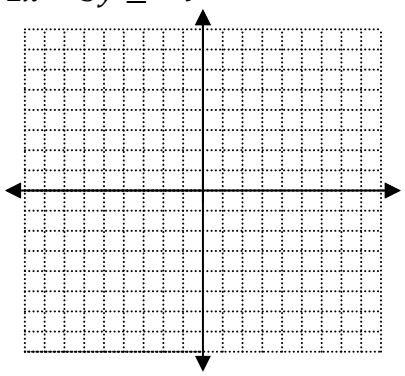
4. $f(x) < -2x - 1$



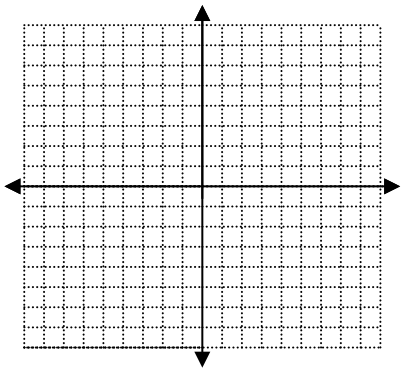
5. $y \geq 4$



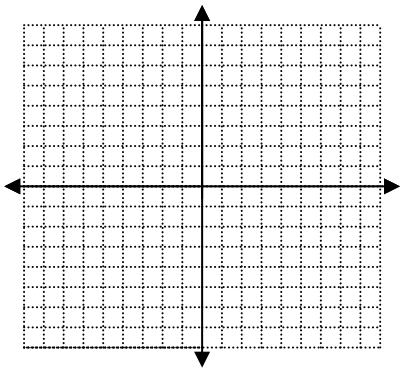
6. $2x - 3y \leq -9$



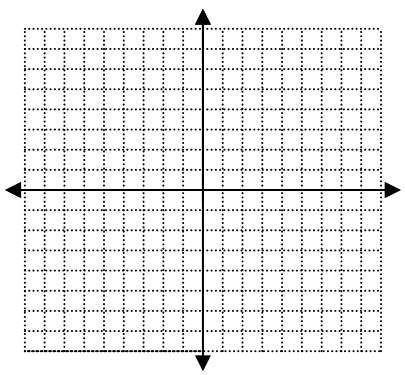
7. $y \geq 2|x| - 4$



8. $f(x) < |x + 2| + 1$

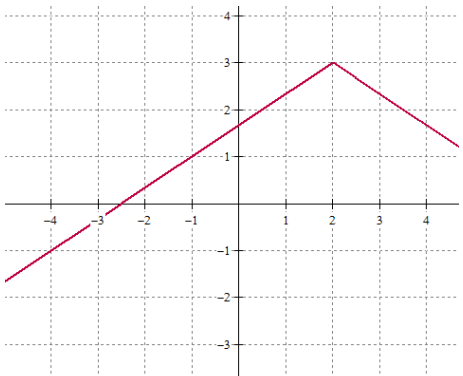


9. $y > -\frac{1}{3}|x - 5| + 3$

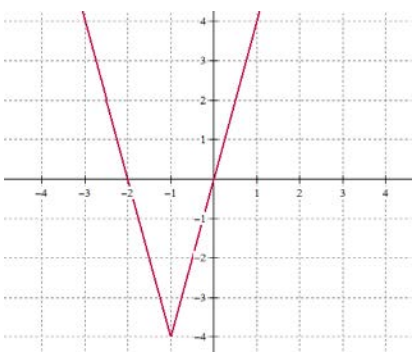


Write the equation of the absolute value function.

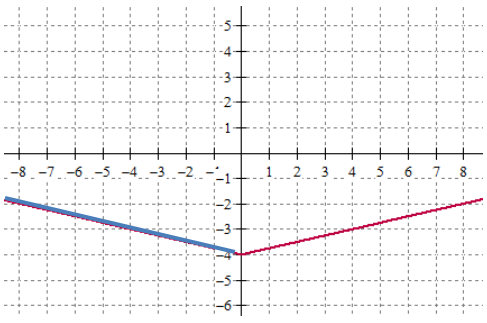
10.



11.

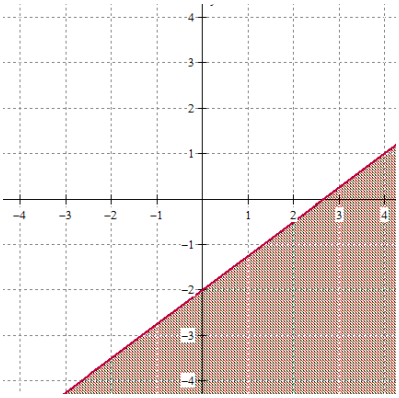


12.

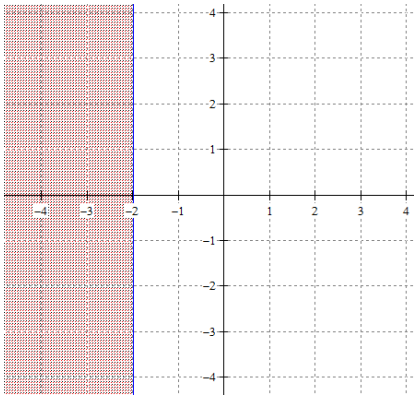


Write the equation of the following inequality. Is the point given in the solution set?

13. (3,0)

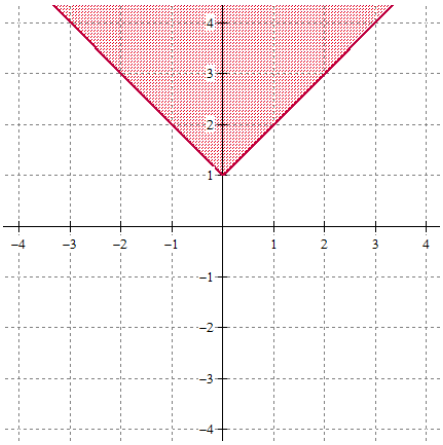


14. (-1,-3)

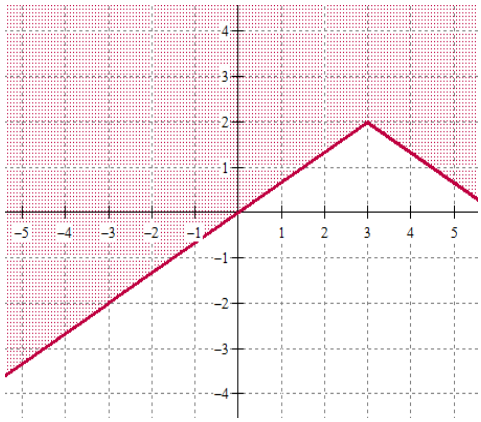


15. (0,1)

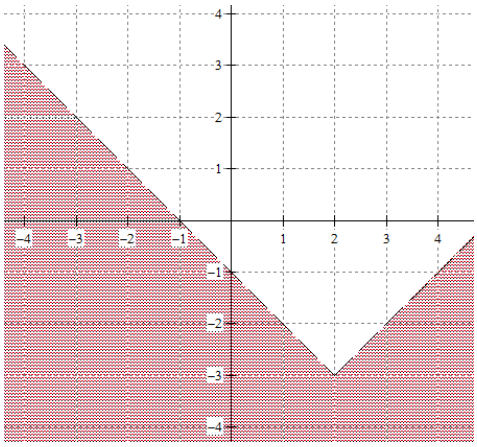
16. (-1,2)



17. (2,1)



18. (-3,1)



Multiple Choice

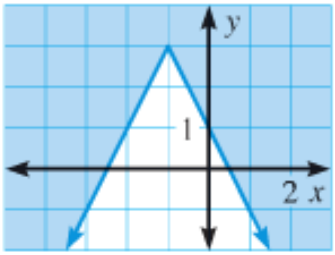
19. The graph of which inequality is shown?

A. $y \leq -2|x+1|+3$

B. $y \geq -2|x-1|+3$

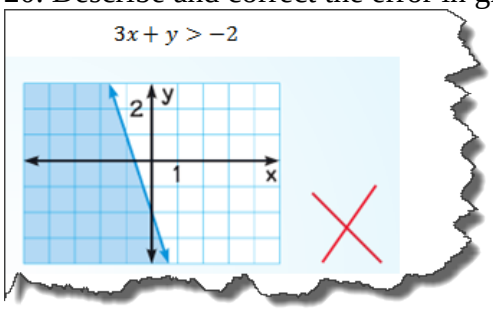
C. $y > -2|x+1|+3$

D. $y \geq -2|x+1|+3$



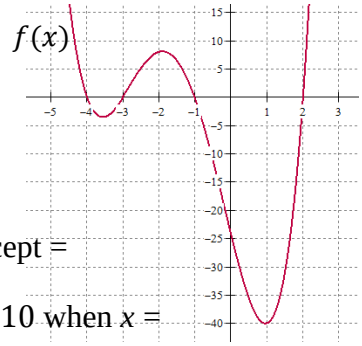
Error Analysis

20. Describe and correct the error in graphing.



ALGEBRA SKILLZ!

GRAPH



a. $f(1) =$

b. y-intercept =

c. $f(x) = 10$ when $x =$

d. x-intercept(s) =

SIMPLIFY

Simplify the radical.

a. $\sqrt{32}$

b. $-3\sqrt{45}$

SOLVE

Solve for x.

a. $\frac{3}{x-2} = 8$

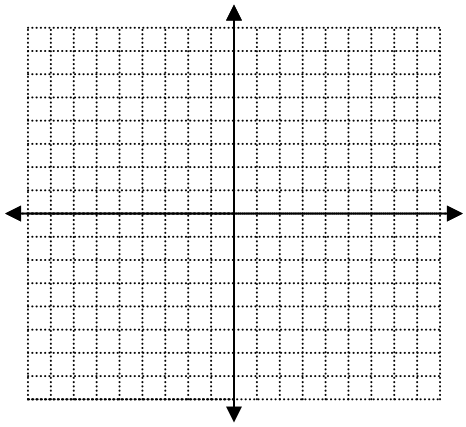
FACTOR

b. $x^2 - 9$

3.2 Absolute Value Graphs

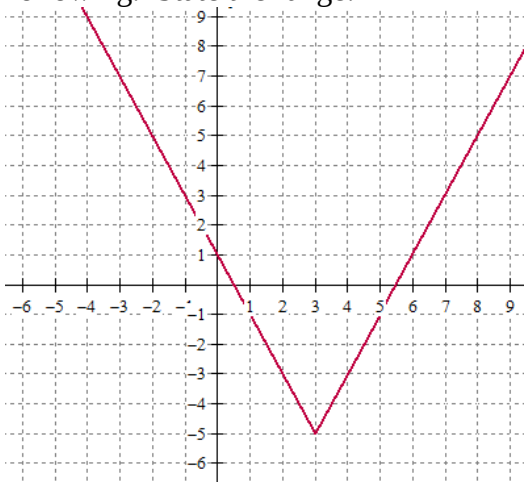
APPLICATION

1. Graph $f(x) > -\frac{3}{4}|x-2|+3$



2. Write the equation of the following. State the range.

Range =



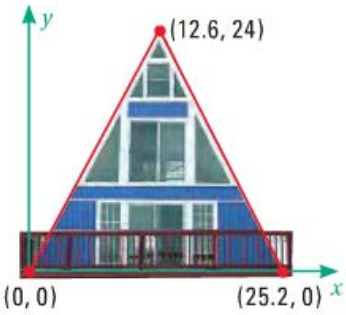
3. **VERBALLY** Mr. Bean is selling "Bean" burritos to raise money to promote awareness for Mad Cow Disease. His sales skyrocket until people start getting sick because Mr. Bean undercooked the beef in his "Bean" burritos which leads his sales to decline sharply. The irony of it. The function $s(t) = -15|t-5|+180$ represents his sales in dollars where *t* is time in days.

   a. What does *s*(3) mean? Find it!

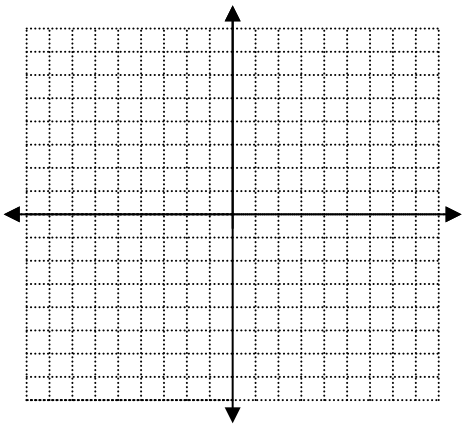
   b. What is the maximum amount of money Mr. Bean raised in one day?

   c. On what day(s) did Mr. Bean make 160 dollars?

4. **COORDINATE GEOMETRY** An "A-frame" house is shown below. The coordinates of *x* and *y* are measured in feet. Write the equation of the absolute value function that models the front of the house.



5. **ALGEBAICALLY** Solve the equation $2|x+3|-4<0$.

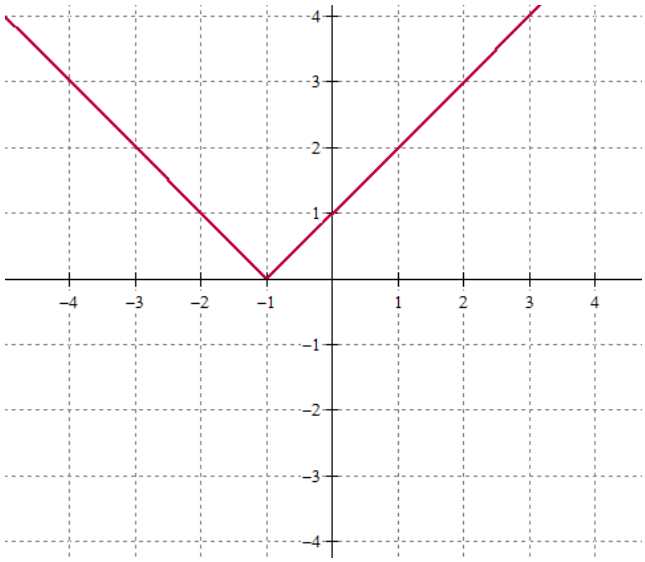


Now graph $2|x+3|-4<y$. Explain how the solution relates to the graph.

6. **CONJECTURE**

Mr. Kelly and Mr. Sullivan are admiring the absolute value function $y=|x+1|$. Mr. Kelly says, "To reflect an absolute value function you put a negative outside of the absolute value like this $y=-|x+1|$". Mr Sullivan says "No way homeslice, to reflect it you put the negative in front of *x* like this $y=|-x+1|$." Who is correct?

The original function $y=|x+1|$ has been graphed for you. →



a. Fill in the tables below.

b. Sketch a graph of Kelly's "reflection" $y=-|x+1|$

c. Sketch a graph of Sully's "reflection" $y=|-x+1|$

Original
$y=|x+1|$

x	*y*
-3	
-2	
-1	
0	
1	

Kelly
$y=-|x+1|$

x	*y*
-3	
-2	
-1	
0	
1	

Sullivan
$y=|-x+1|$

x	*y*
-2	
-1	
0	
1	
2	