

L42 – 7.2 Absolute Value Functions**Key Ideas**

Absolute Value brackets can be found in your calculator (MATH > NUM > 1. Abs)

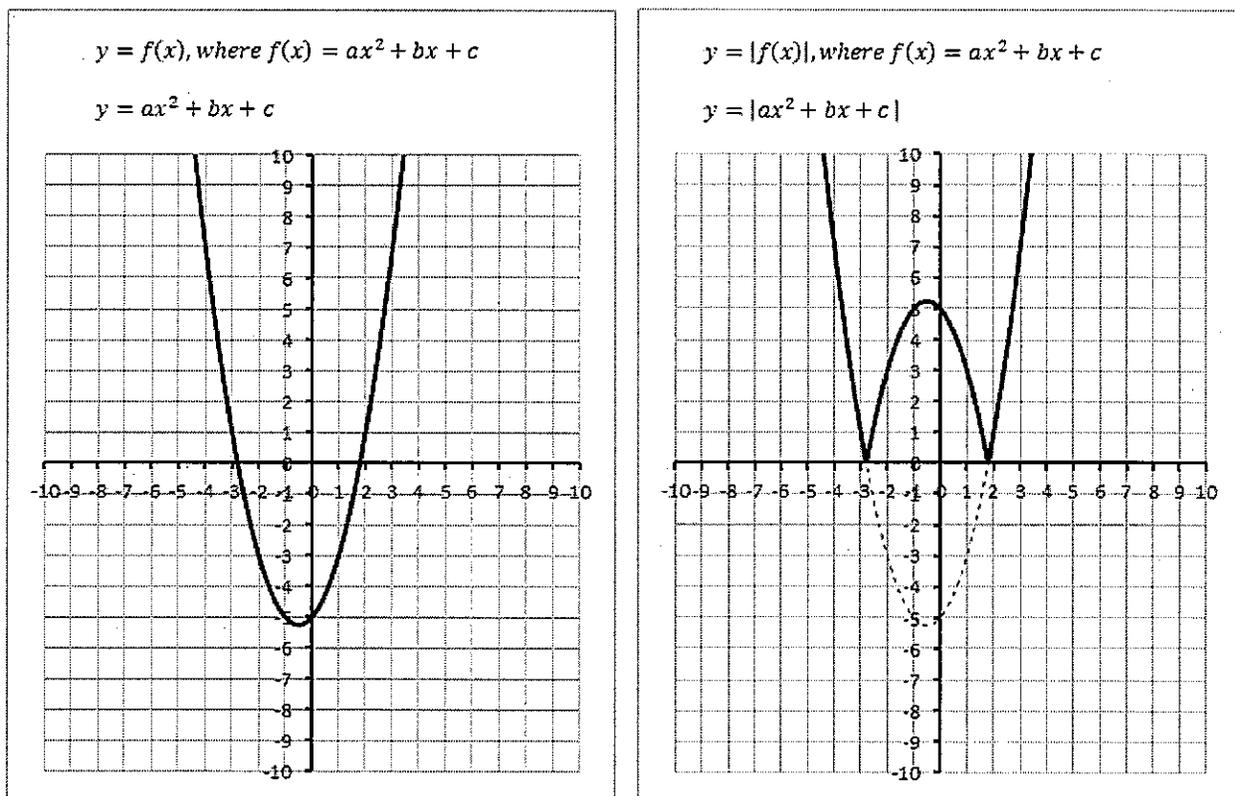
Working with Absolute Value Functions Graphically:

- Input into your calculator graphing using the Abs(), then use 2nd CALC to find your y-intercept, x-intercept, minimum or maximum values, Domain and Range.

Working with Absolute Value Functions Algebraically:

- A piecewise function $y = \begin{cases} f(x), & \text{if } f(x) \geq 0 \\ -f(x), & \text{if } f(x) < 0 \end{cases}$
- Domain of $y = |f(x)|$ is the same as $f(x)$
- Range of $y = |f(x)|$ depends on the range of $y = f(x)$

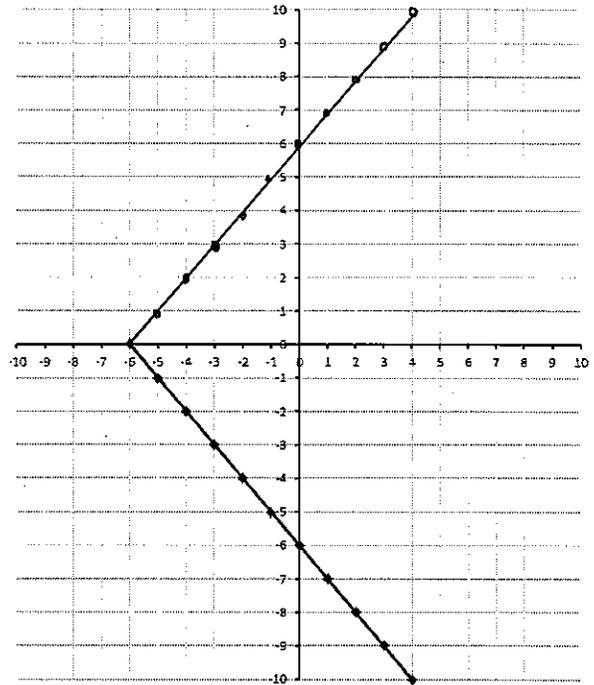
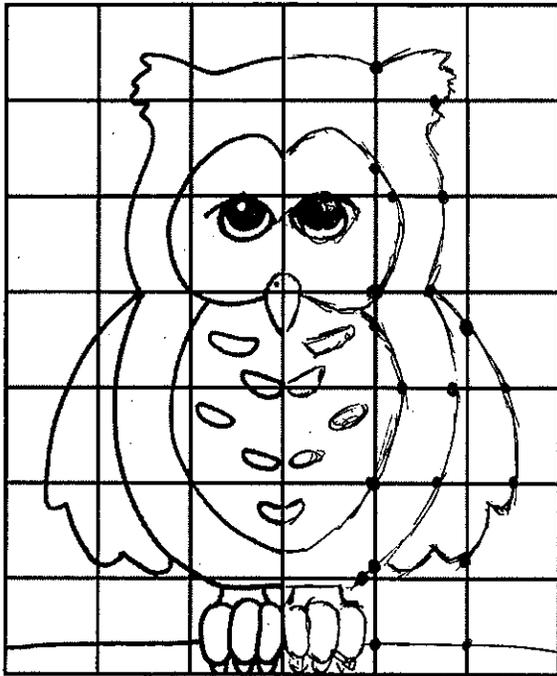
For the Absolute Value of a linear or quadratic function, the range will generally be, **but not always**, $\{y | y \geq 0, y \in R\}$



See "L41 – Tool – Absolute Value and Reciprocal Functions" Excel sheet.

Part 1 – Mirror Images

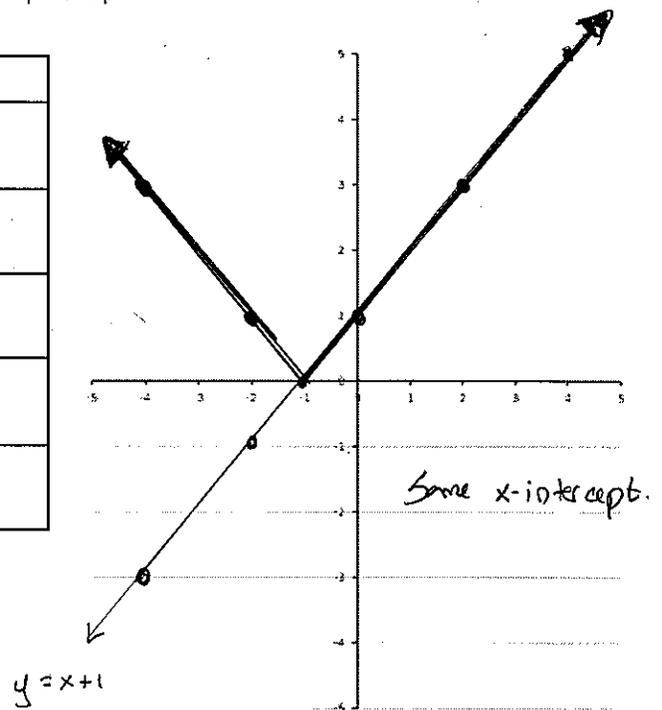
Complete the images. Ensure the missing side is a mirror image of the given side.



Part 2 – Absolute Value Functions

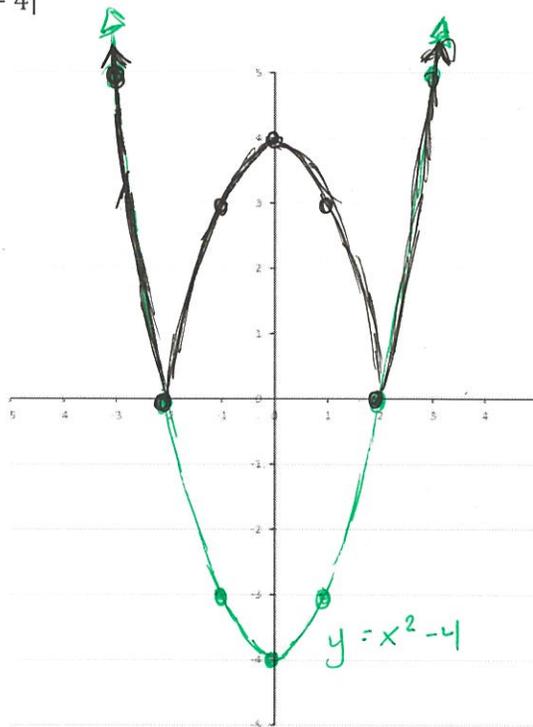
Q1: Complete the table and sketch the graph for $y = |x + 1|$

x	$x+1$	$ x+1 $
-4	-3	3
-2	-1	1
0	1	1
2	3	3
4	5	5

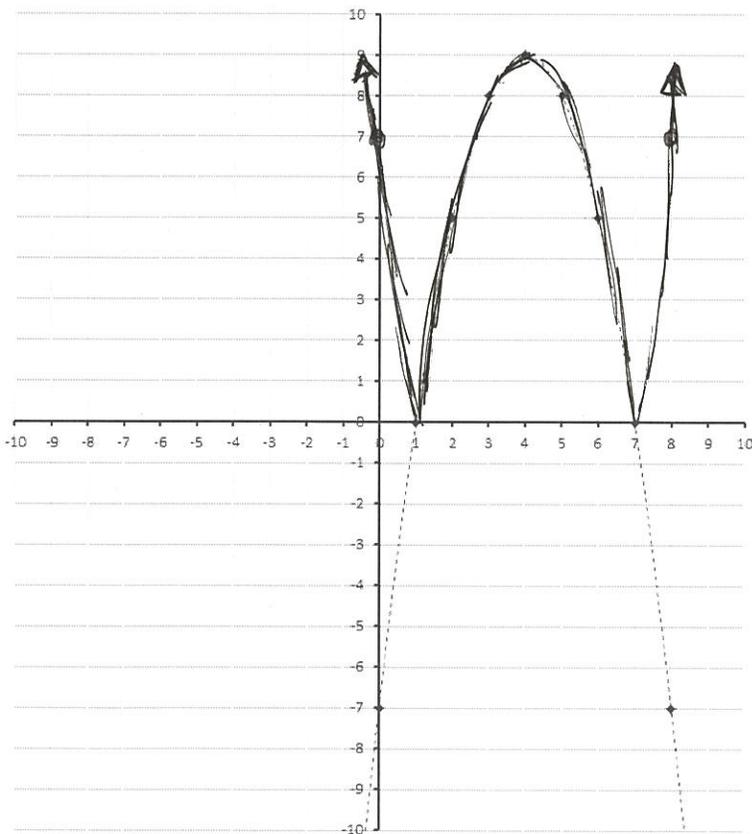


Q2: Complete the table and sketch the graph for $y = |x^2 - 4|$

x	$x^2 - 4$	$ x^2 - 4 $
-3	5	5
-2	0	0
-1	-3	3
0	-4	4
1	-3	3
2	0	0
3	5	5

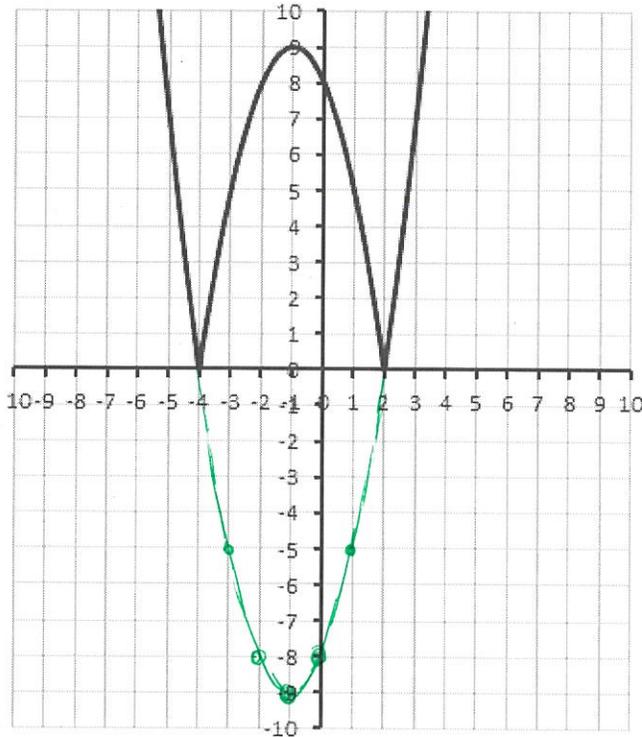


Q3: Given the function, sketch the absolute value function on the same graph paper.



Same x-intercept.
y-intercept is now positive.

Q4: For the given graph, determine the piecewise function.

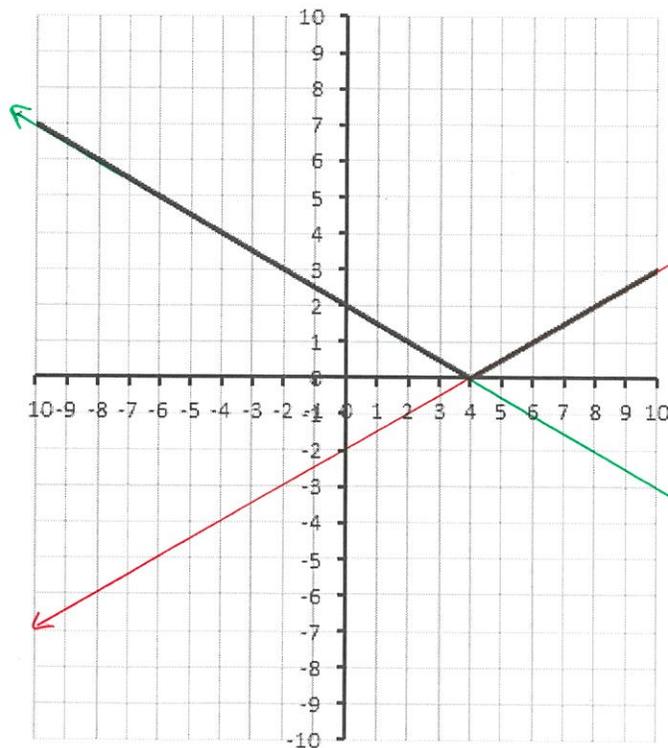


$$y = 1(x+1)^2 - 9 \text{ for } x \leq -4$$

$$y = -1(x+1)^2 + 9 \text{ for } -4 < x < 2$$

$$y = 1(x+1)^2 - 9 \text{ for } x \geq 2$$

Q5: For the given graph, determine the piecewise function.



$$y = -\frac{1}{2}x + 2 \text{ for } x \leq 4$$

$$y = \frac{1}{2}x - 2 \text{ for } x > 4$$

$$y = \frac{1}{2}x - 2$$

$$y = -\frac{1}{2}x + 2$$

Part 3 – Graphing Absolute Value Functions using a T.I. Calculator

Q6: Graph the two functions using your T.I. Calculator

$$f(x) = x^2 - 5x + 4$$

$$g(x) = |x^2 - 5x + 4|$$

Build a table of values for each:

x	$x^2 - 5x + 4$	$ x^2 - 5x + 4 $
-1	10	10
0	4	4
1	0	0
2	-2	2
3	-2	2
4	0	0
5	4	4
6	10	10

