Investigating Graphs of Functions

As you investigate functions it is important that you understand what is expected when you are asked to "sketch" a graph. To **Sketch a Graph** means to show the approximate shape of the graph in the correct location with respect to your axes, **and** to **clearly label all key points**.

1. Use Desmos to graph the function $f(x) = \sqrt{4 - x} - 2$.

2. **Sketch** the graph on your paper.

3. What are all the possible values of *x* that will give a result for *f(x)?* Make a table for *x* in the interval (–5, 6). Did you find any values that will not work? What is the largest value you can substitute for *x?* Why is can't you use larger values? What is the DOMAIN for this function?

4. Does the graph ever cross the horizontal line *y = 50?* What about *y= 500?* How do you know?

5. What is the smallest possible for *f(x)*? What are all the possible values for *f(x)*? Describe the RANGE for the function *f.*

6. Does the line *y = x* intersect the graph of the function *f*? Use Desmos to estimate the point of intersection.

7. Use Desmos the graph each of the following, and sketch a graph of each, AND clearly describe the domain and the range for each.
   a. $g(x) = \sqrt{100 - x^2}$
   b. $h(x) = x^2 - 7$
   c. $y = \sqrt{x + 6} + 2$
   d. $k(x) = |2x - 6| + 4$

8. Enter the function $s(x) = \frac{|x-1|}{x-1}$ into Desmos. Then, in the next line, enter *"s(a)"* and then create a slider for *a* that goes from -10 to 10. As you slide along, what are the values for s(x)? Where does the value change? What happens when *a = 1?* Use this to give a domain and range for the function *s.*