1C: Key Features of a Function

To fully understand a function, we must study it's important features. The following is a brief description of some of these features to be familiar with.

1 **Domain:** The set of allowable inputs (x – values).

2 **Range:** The set of possible outputs (y– values).

3 **Continuity:** A function is _continuous_ if it is smooth over its domain with no "jumps" or breaks in the range values, otherwise it is _discontinuous_.

4 **Increasing/Decreasing/Constant** intervals: Do the y values increase, decrease, or stay constant as x gets larger?

5 **Symmetry:**
   - A function has _even line symmetry_ if the graph is symmetric about the y-axis and $f(-x) = f(x)$.
   - A function has _odd point symmetry_ if the graph has rotational symmetry about the origin and $f(-x) = -f(x)$.

6 **Bounded:** A function is _bounded below_ if it has a global minimum, it is _bounded above_ if it has a global maximum. Otherwise it is _not bounded_.

7 **Minimums:** A point whose y-value is less than its neighboring points.

8 **Maximums:** A point whose y-value is greater than its neighboring points.

9 **Horizontal Asymptotes:** A horizontal line $y = a$ which the graph approaches but never intersects.

10 **Vertical Asymptotes:** A vertical line $x = b$ which the graph approaches but never intersects./

11 **End Behavior:** How does the y-value change as $x \rightarrow \infty$ and $x \rightarrow -\infty$.

12-Basic Functions Activity

For each function in the top row do the following:

1. Graph the function in your calculator and sketch the plot in the 1st row.
2. Describe each of the features listed above.
3. Use interval notation when appropriate.
4. Be as specific as possible.