- A function is a conceptual machine that eats an input and gives you back an output. It always gives you the same output when you feed it the same input.
- A real world function: temperature at Fairbanks International Airport as a function of day and time.
- Mathematical functions model real world functions.
- In our class, functions eat a real number and give you back a real number as its output.
- Examples of mathematical functions:

$$\circ f(x) = 1/x$$
  

$$\circ g(h) = \cos\left(\frac{x-3}{7}\right)$$
  

$$\circ p(x) = 3x^4 - 2x + 9$$

- **Domain**: The allowed set of inputs to a function
- **Range**: For our class, the set of all possible outputs of a function.
- Just one real number as output for us:  $\sqrt{9} = 3$ . Not  $\pm 3$ .
- Functions can be defined piecewise. Here's a really important one.

$$|x| = \begin{cases} x & x \ge 0\\ -x & x < 0 \end{cases}$$