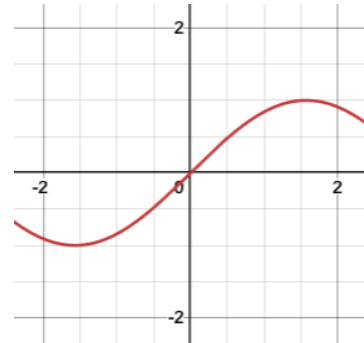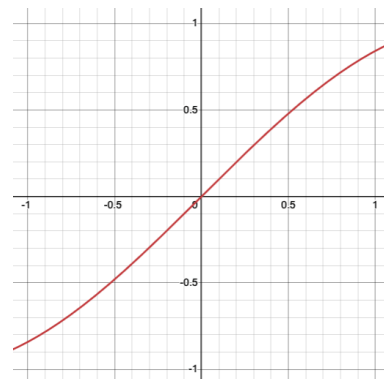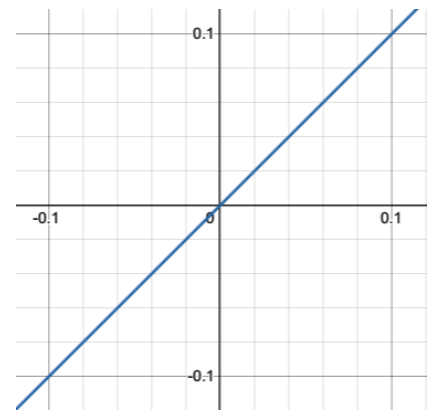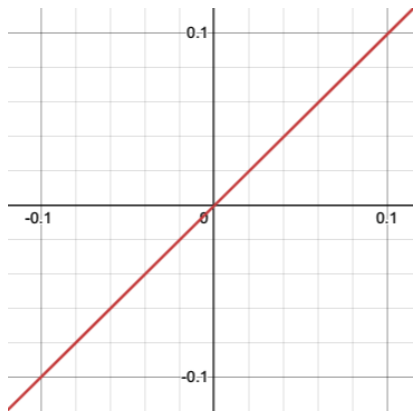# Calculus 2.3 Key Points

Local Linearity:

Take a look at this graph of $sin(x)$. It has quite a few curves, but let's zoom in

It looks a lot more like a line, but let's zoom in a little bit more

Now, it looks just like a line. On the right is $y = x$ for comparison.

The idea of local linearity is that functions may be approximated by a line at very tiny intervals after zooming into a point on the function. This idea is very useful when trying to find the slope of a function at a point, which you will encounter later with <u>derivatives</u>
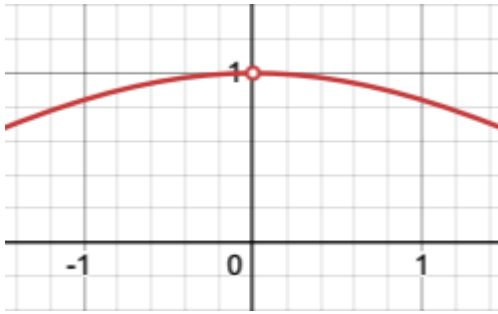
Not all functions can be approximated at every point by a line, such as if there is a sharp turn, called a cusp.
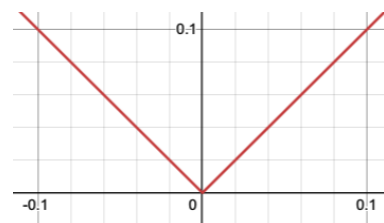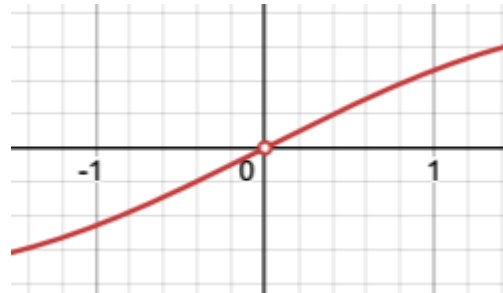
Calculus 2.3 Key Points

Limits of Trigonometric Functions:

$$\lim_{h \to 0} \frac{sin(h)}{h} = 1 \qquad\qquad \lim_{h \to 0} \frac{1-cos(h)}{h} = 0$$

These limits will be useful for proving the derivatives(slope functions) of $sin(x)$ and $cos(x)$ later

Rate-Time-Distance Formula:

$d = rt$, where:

d is the total distance traveled
r is the speed
t is the time that it took to travel the distance

If you know two of the variables, you can figure out the third.