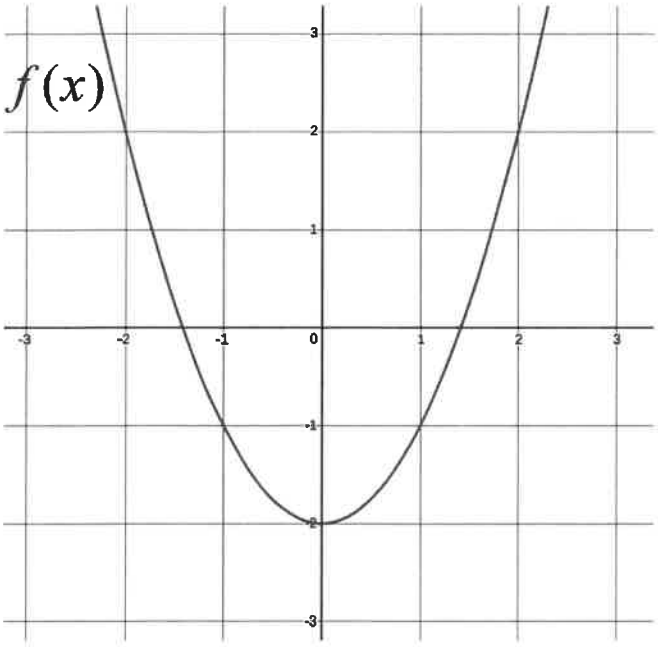
Graphing the Derivative of a Function

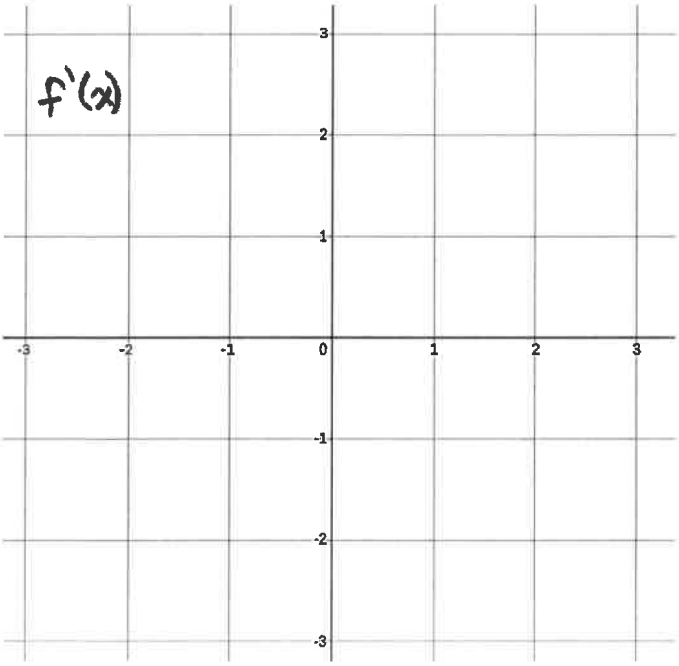
Remember that the derivative at a point on the graph is the instantaneous slope (the slope of the tangent line) at that point!



1. Look at the graph of $f(x)$. What type of function is this? Describe the parent function and the equation.

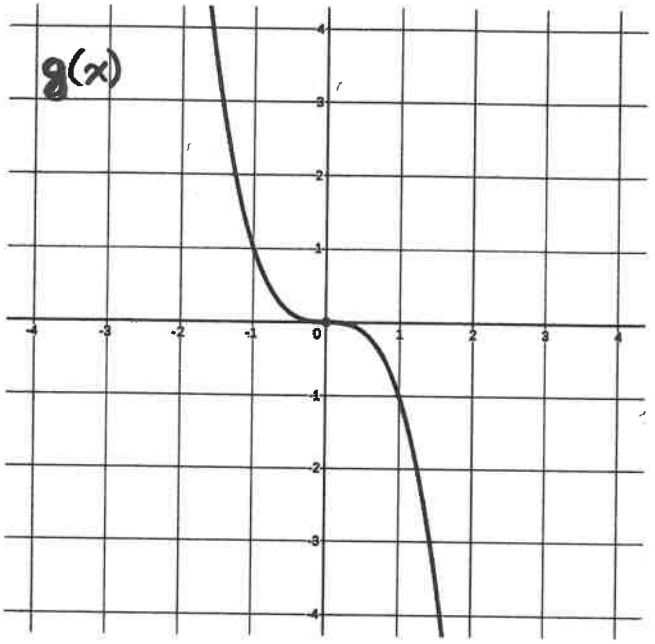
2. Hold a ruler horizontally so that its slope is zero. Find the point on the graph of $f(x)$ that will touch the horizontal ruler only once. This is the point that is tangent to a horizontal line. Mark this point on the graph of $f(x)$ clearly. Write out the values for x, $f(x)$, and $f'(x)$ (the slope of the tangent line) at this point.

3. Mark a point on the blank coordinate plane for $f'(x)$ below. This represents the point $(x, f'(x))$.



4. Now use your ruler to identify the point on the graph of $f(x)$ where your ruler (i.e. tangent line) has a slope of 2. Use the gridlines to be as precise as possible. Do the same for slopes of -2, 3, and -3. Mark each of these points on the graph of $f(x)$. Write the values for x, $f(x)$, and $f'(x)$ at each location.

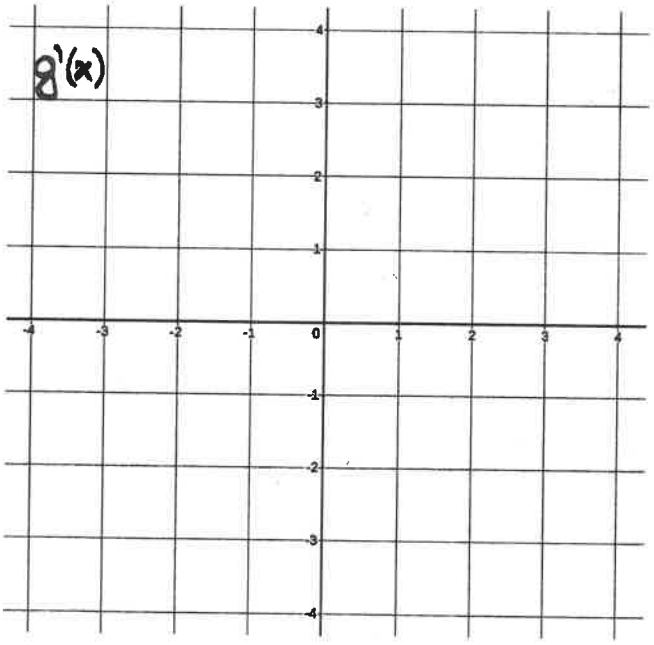
5. Connect the points that you have placed on the coordinate plane for $f'(x)$ using a line of best fit. What type of function is this? Describe the parent function and the equation.



1. Look at the graph of $g(x)$. What type of function is this? Describe the parent function and the equation.

2. Using your ruler, mark all points on the graph where the derivative (slope of the tangent line) is 0 and -2. Write the x, $g(x)$, and $g'(x)$ values for each of those points.

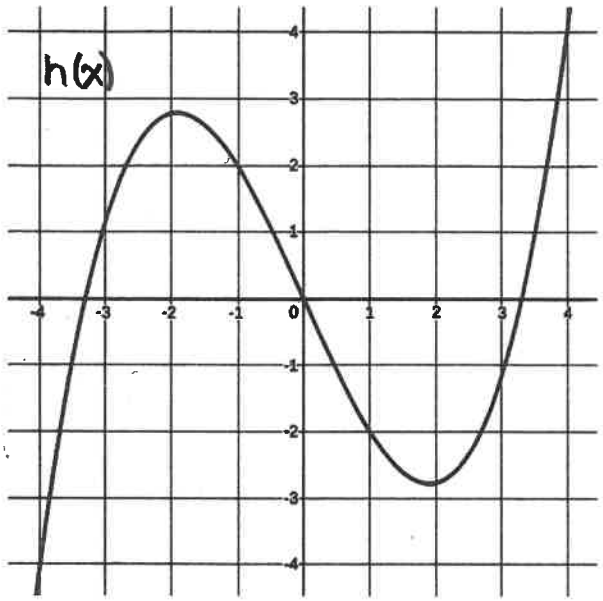
3. Is the slope of the tangent line positive at any point along the graph of $g(x)$?

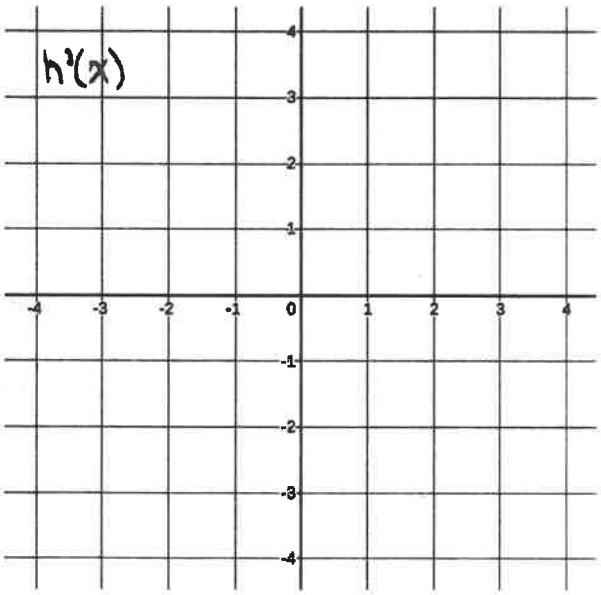


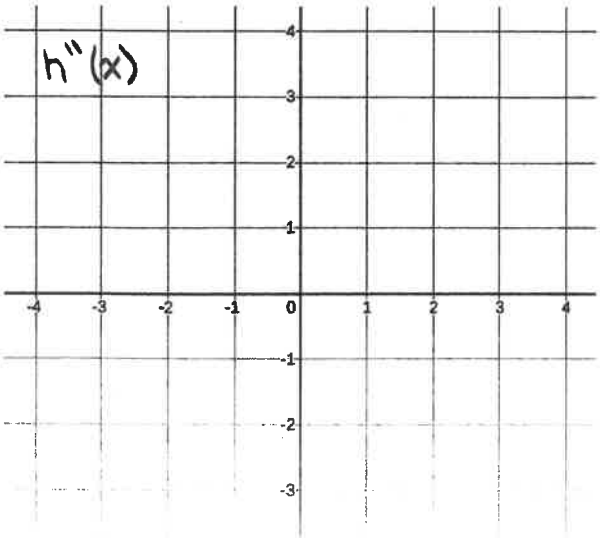
4. Mark the 3 points on the coordinate plane found in #2 on the coordinate plane for $g'(x)$. What type of function does the graph of $g'(x)$ appear to be?

5. If the graph of $g(x)$ was shifted to the right three units, what would happen to the graph of $g'(x)$?

6. If the graph of $g(x)$ was shifted up three units, what would happen to the graph of $g'(x)$?







1. Using your ruler identify the slope of your choosing of some of the points on the graph of $h(x)$. Mark these points on the coordinate plane for $h'(x)$.

2. What kind of graph does $h'(x)$ appear to be? Describe the parent function and its equation.

3. Using your ruler on your graph of $h'(x)$, do the same process to create a graph of $h''(x)$ (the second derivative of $h(x)$. Again choose your own points to find the slopes of. Use the coordinate plane for $h''(x)$ to graph the second derivative of $h(x)$. Describe the graph of the second derivative.

4. Identify the degree of each function. What do you notice about the degree of each derivative function compared to its original function? Is this true for the functions on the previous pages as well? Make a prediction about the degree of $f(x)$ in relation to the degree of $f'(x)$.

5. Describe the derivative of a linear function. What would the graph look like? Why?