Handout: Find the Derivative of a Function Given by a Graph (Stewart Section 2.2)

Goal: Given the graph of f on the top axes on the next page, make a graph of f' on the bottom axes.

On the graph of f', the input will be x and the output will be $f'(x)$.

This means that when a ***particular real number*** $\boldsymbol{x = a}$ is used as *input* to the function $f'(x)$, the *resulting output* will be the **real number** $\boldsymbol{f'(a)}$.

Remember the graphical interpretation of $f'(a)$, where a is a particular ***real number***:

Definition of the *Derivative of f at a*

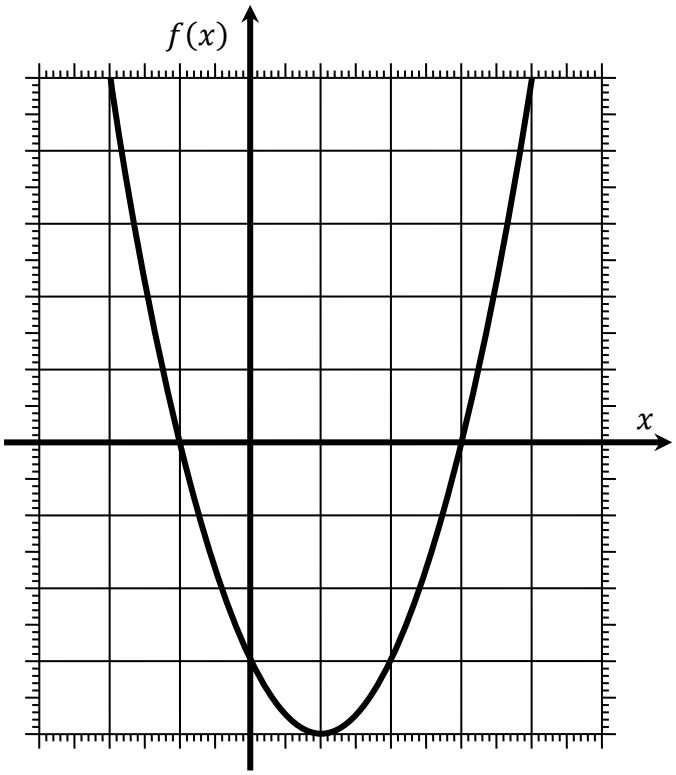
- **symbol:** $f'(a)$
- **graphical interpretation:** $f'(a)$ is the number that is the slope of the line tangent to the graph of f at the point on the graph where $x = a$.

We build a graph of $f'(x)$ by making a table with particular real number values of x in the left column, to use as inputs. (These can be thought of as a bunch of different $x = a$ values) We then find the resulting real number values of $f'(x)$. (That is, the corresponding values of $f'(a)$.)

Part 1: Prepare the data for your graph of f' by filling out the following table.

x	what to do on the graph of f	$f'(x)$
-2	Draw the line tangent to the graph of f at the point where $x = -2$ and find its slope m. This slope m will be the value of $f'(-2)$.	
-1	Draw the line tangent to the graph of f at the point where $x = -1$ and find its slope m. This slope m will be the value of $f'(-1)$.	
0	Draw the line tangent to the graph of f at the point where $x = 0$ and find its slope m. This slope m will be the value of $f'(0)$.	
1	Draw the line tangent to the graph of f at the point where $x = 1$ and find its slope m. This slope m will be the value of $f'(1)$.	
2	Draw the line tangent to the graph of f at the point where $x = 2$ and find its slope m. This slope m will be the value of $f'(2)$.	
3	Draw the line tangent to the graph of f at the point where $x = 3$ and find its slope m. This slope m will be the value of $f'(3)$.	
4	Draw the line tangent to the graph of f at the point where $x = 4$ and find its slope m. This slope m will be the value of $f'(4)$.	

Part 2 is on back ➔



Part 2: Using the $\big(x, f'(x)\big)$ data from your table, make a graph of f'.