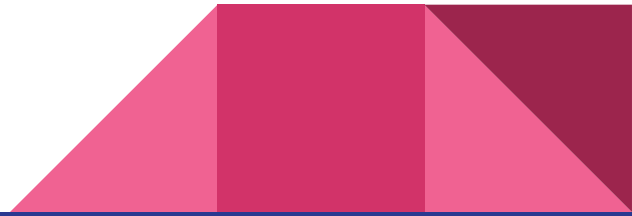
The derivative as a function

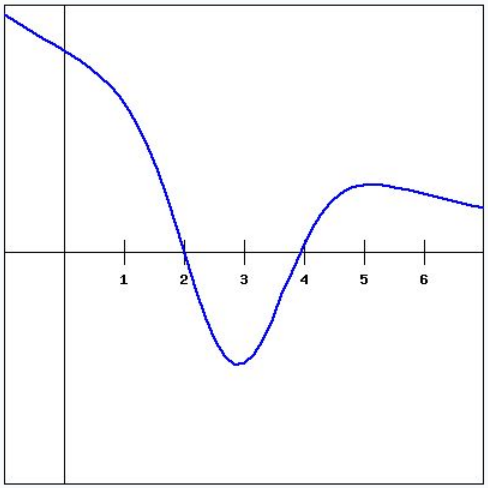
MTH 201 -- Module 2B

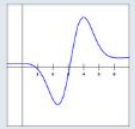
Today

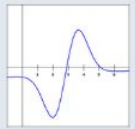
- Review of the derivative
- Finding a formula for the derivative using the limit definition



The graph of $f(x)$ is shown. Which is the graph of $f'(x)$?







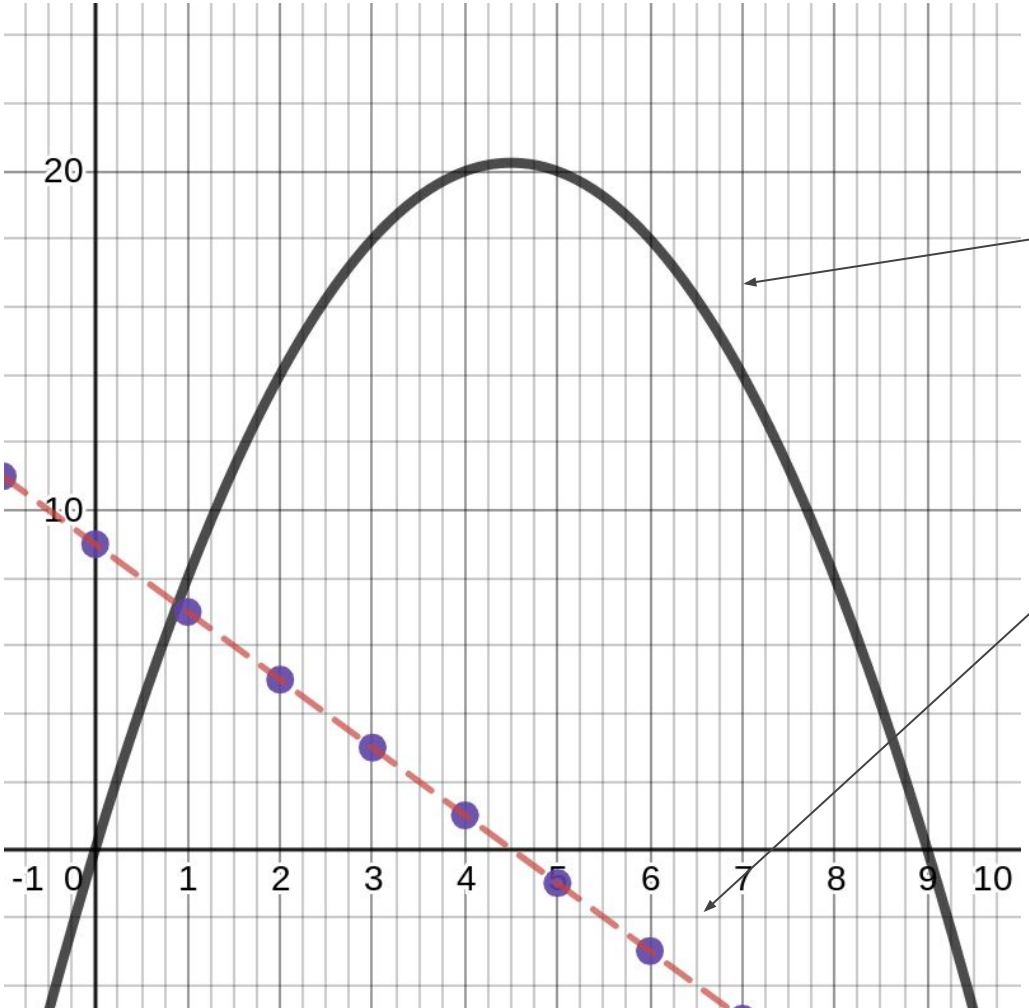
Using the limit definition to find a formula for the derivative

The **derivative** of the function y = f(x) at the point x = a:

$$f'(a) = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h}$$

The derivative of f(x) at x = a, f'(a), is all of the following things:

- The **instantaneous rate of change** in f(x) at x = a
- If f(t) is a position at time t, f'(a) is the **instantaneous velocity** at time t = a
- The **slope of the tangent line** to the graph of f(x) at x = a



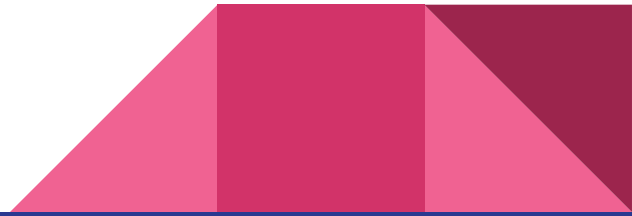
$$f(x) = 9x - x^2$$

$$f'(x) = 9 - 2x \ldots ?$$

See Jamboard for a derivation, then practice on your own

What is this for?

- NOT for everyday use; formulas are rare, and too complicated for this process when they appear
- It’s for setting up estimations to the derivative (see Module 3)
- It’s for building simpler rules that work in general for finding derivative formulas



Feedback:
http://gvsu.edu/s/1zJ