TA: Kyle Hansen (kylehansen@math.ucsb.edu)
Office: South Hall, 6431 V
OH: M 11-12pm / **ML:** Th 1-3pm

Name:

"The only constant is change."
-Hericletus

Collaborators:

Section Day/Time:

Limits & Derivatives

1. Evaluate each limit, showing all your work.

a) $\lim_{x\to\infty} 4x^7 - 18x^3 + 9$

b) $\lim_{x\to-\infty} 4x^7 - 18x^3 + 9$

c) $\lim_{x\to\infty} \dfrac{8-4x^2}{9x^2+5x}$

d) $\lim_{x\to-\infty} \dfrac{8-4x^2}{9x^2+5x}$

Derivative Definition(s)

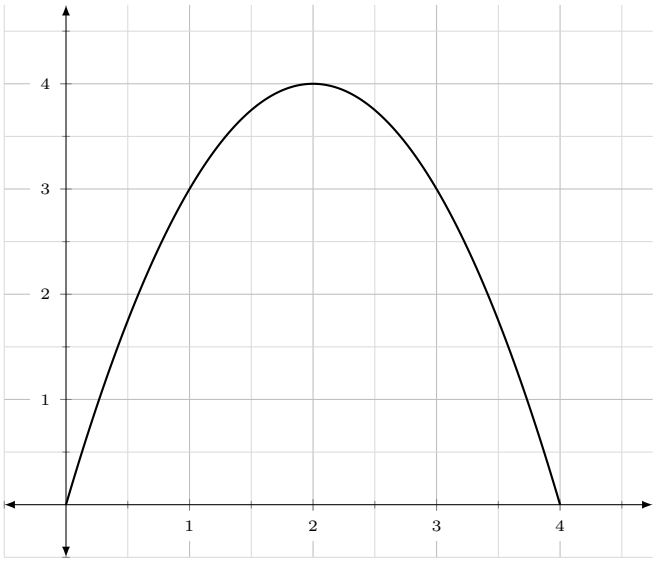
The derivative of a function $f(x)$ at the number $x = a$ is $f'(a) =$

The derivative for all $y = f(x)$ is $f'(x) =$

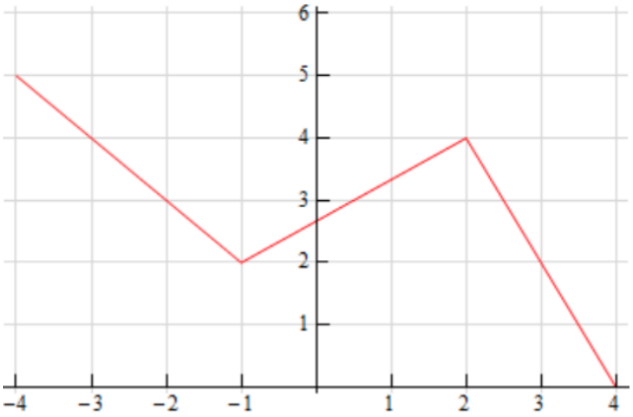
2. Use the definition of the derivative to find the derivative of $f(x) = \frac{x+1}{x+4}$. Show all your work.

3. Find the equation of the tangent line to the curve $f(x) = -x^2 + 4x$ at the point $(2, 4)$ by using the definition of the derivative. Sketch a graph to check your answer.

If you have time, use the derivative definition to find $f'(x)$ for all x, and sketch part of its graph.



4. Sketch the derivative of the graph of $f(x)$ depicted below.



Discuss: If $f(x)$ above is the derivative of some function $g(x)$ so that $g'(x) = f(x)$, what might the graph of $g(x)$ look like?