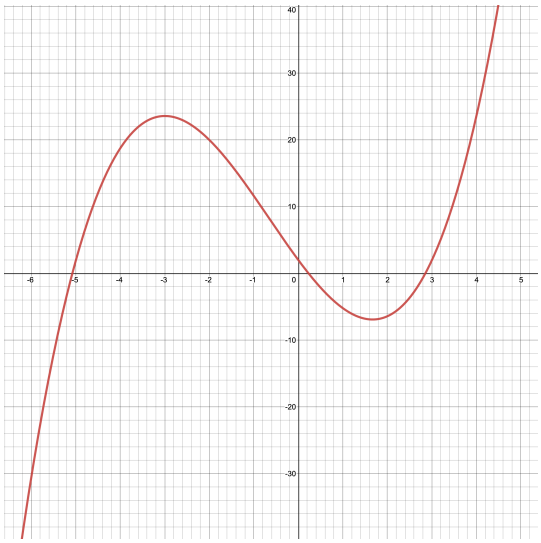
# Problem Set #1

Due Thursday, February 3, 2022 @ midnight EDT
Submit as single pdf file to onCourse

*Remember that you need to explain and show the steps in your answers!*

1. Let $f(x) = x^3 - 5x$, $g(x) = x - 4$, and $h(x) = x + 2$.
   (a) Evaluate $(f \circ g \circ h)(-3)$
   (b) How is the graph of $y = (f \circ g)(x)$ related to the graph of $y = f(x)$?
   (c) How is the graph of $y = (h \circ f)(x)$ related to the graph of $y = f(x)$?

2. The graph of $y = f(x)$ is shown below.
   (a) Is $f(-2)$ positive, negative or zero? Explain.
   (b) Is $f'(-2)$ positive, negative or zero? Explain.
   (c) Give a value $x = a$ where $f(a) < 0$ and $f'(a) > 0$. Explain.




Graph of $y = f(x)$

3. Use the graph of $y = f(x)$ from Problem 2.
   (a) Copy the graph of $y = f(x)$ and sketch a graph of $y = f'(x)$ on the same set of axes.
   (b) Is $f''(-3)$ positive, negative, or zero? Why?

4. Solve the equation $\ln(x^2 + 4) = 2$ for $x$. Be sure to show your steps.