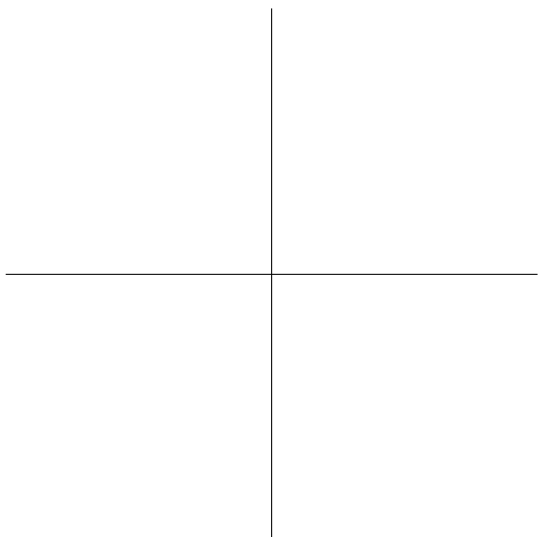


Weekly Homework #1

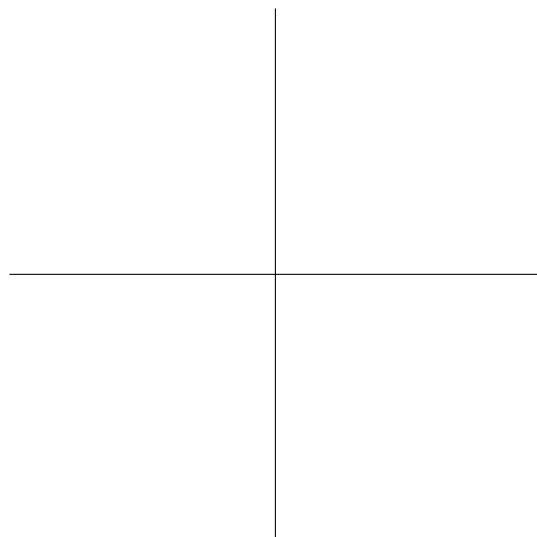
Due Friday, January 8

1. Sketch the graph of the given function. Remember to label the axes with tick marks.

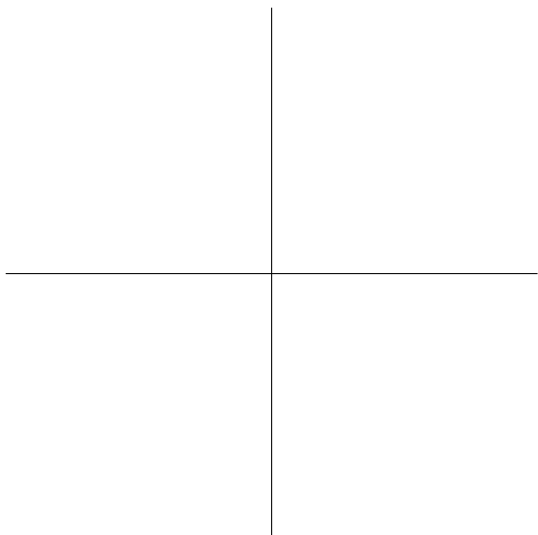
(a) $f(x) = x^2$



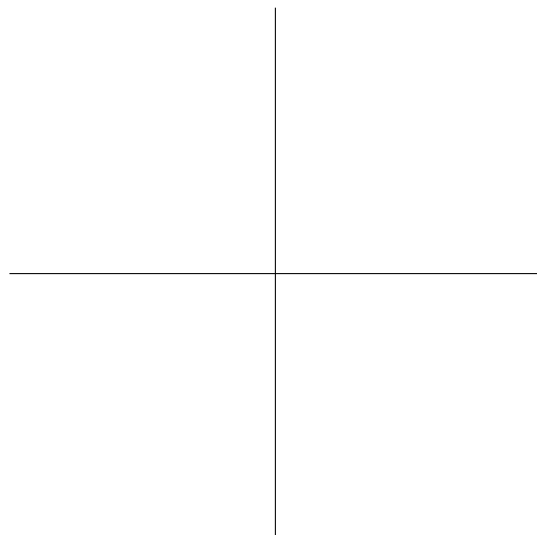
(b) $f(x) = x^2 + 2$



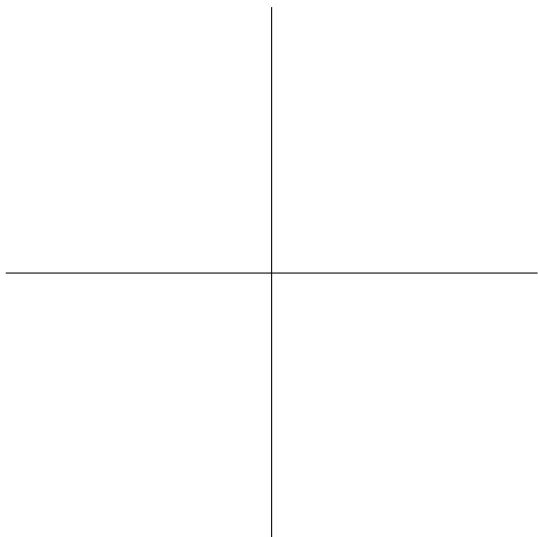
(c) $f(x) = (x - 3)^2$



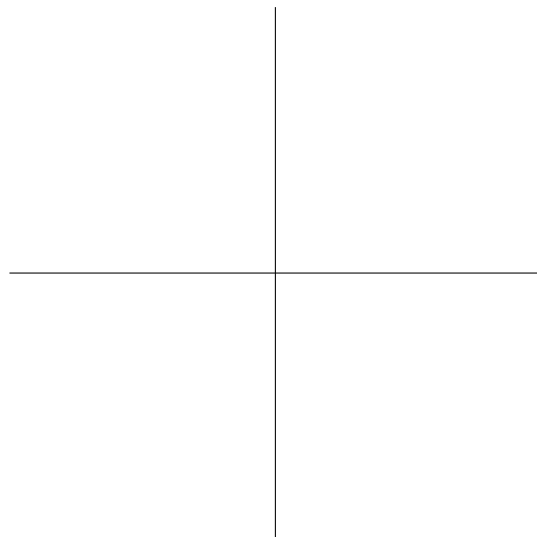
(d) $f(x) = 4x^2$



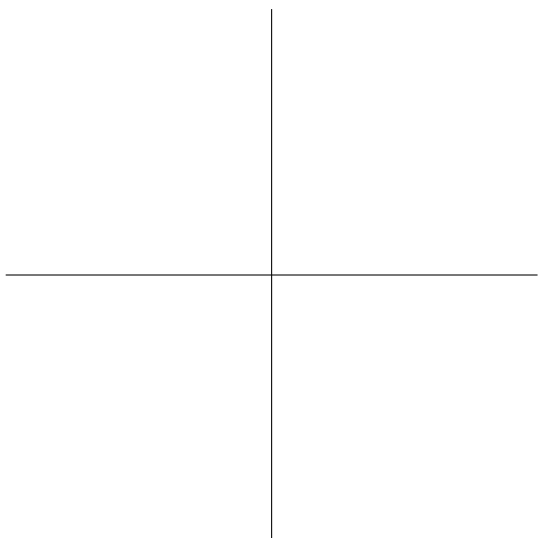
(e) $f(x) = \sin(x)$



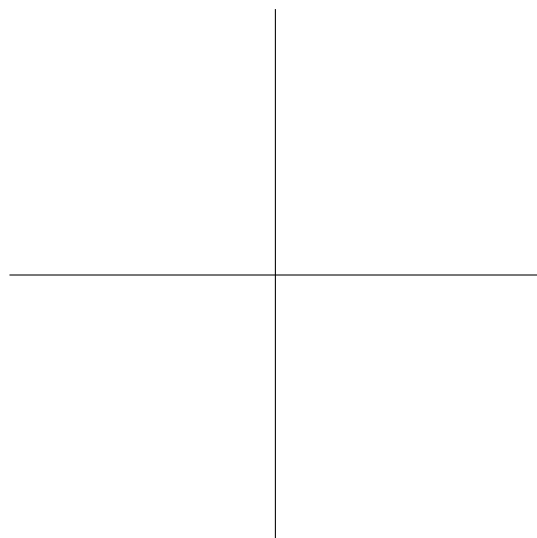
(f) $f(x) = 2 \sin(x)$



(g) $f(x) = \sin(x) + 1$



(h) $f(x) = 3 \cos(x)$



2. Find the equation of the tangent line to the given function at the specified point.

(a) $f(x) = 4x^3 + x + 1$ at $x = 1$.

(b) $f(x) = \frac{2x}{x^2 + 1}$ at $x = 1$.

3. Find the derivative of the given function.

(a) $f(x) = \sin^2(x)$

(b) $f(x) = \cos(3x^2)$

4. Use L'Hôpital's rule to find $\lim_{x \rightarrow 0} \frac{\tan(x)}{x}$.

5. Let $g(x) = x^3 e^x$. Find $g''(x)$.

6. Is the given function continuous? If not, at which value(s) of x is it discontinuous?

(a) $f(x) = |x|$

(b) $g(x) = \begin{cases} \sin(x) & \text{if } x \leq 0 \\ x + 1 & \text{if } x > 0 \end{cases}$

(c) $h(x) = \begin{cases} 5x - 4 & \text{if } x < 1 \\ 1/x & \text{if } x \geq 1 \end{cases}$