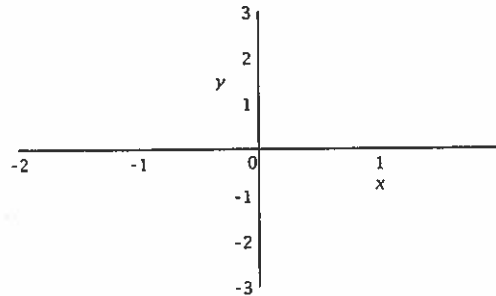
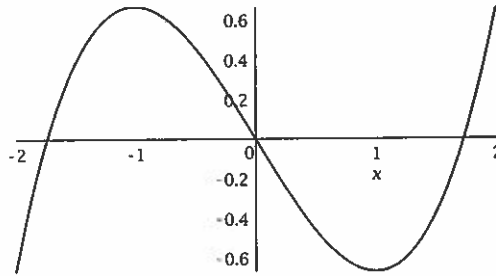


MATH 135 – Calculus 1
 The Derivative Function – Practice Problems
 October 4, 2013

1. Consider the function $f(x) = \frac{x^3}{3} - x$.
- a. Compute $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$.

- b. Here is a plot of $y = f(x)$. On the empty set of axes below plot $y = f'(x)$.



- c. Circle the correct answers: On the interval $(-\infty, -1)$, the derivative $f'(x)$ is *positive/negative* and $f(x)$ is *increasing/decreasing*. On the interval $(-1, 1)$, the derivative $f'(x)$ is *positive/negative* and $f(x)$ is *increasing/decreasing*. On the interval $(1, +\infty)$, the derivative $f'(x)$ is *positive/negative* and $f(x)$ is *increasing/decreasing*.
- d. What happens on $y = f(x)$ when $f'(x) = 0$? _____
- e. (Harder – we have not discussed this!) What happens on the graph $y = f(x)$ then the tangent line to $y = f(x)$ is horizontal? _____

2. Given the graph $y = f(x)$ below, make a *qualitative* sketch of $y = f'(x)$ on the empty set of axes below. Show any places where $f'(x)$ changes sign and places where $f'(x)$ fails to exist.

