Practice Problems — 02/02/05

(1) Using only that the derivative $f'(a)$ is the slope of the tangent line to f at a,
   (a) find the derivative of $f(x) = c$, where $c \in \mathbb{R}$

   (b) find the derivative of $f(x) = mx + b$

   (c) use the graph of $f(x) = \sin(x)$ to sketch $f'(x)$; does this function look familiar?

(2) Use the definition of the derivative to compute $f'(x)$, where

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

(b) $f(x) = \sqrt{x}$

(c) $f(x) = \sqrt[3]{x}$

(3) Use

- $\sin(x+h) = \sin(x)\cos(h) + \cos(x)\sin(h)$,
- $\lim_{h\to 0} \dfrac{\sin(h)}{h} = 1$, and
- $\lim_{h\to 0} \dfrac{\cos(h)-1}{h} = 0$

to compute $\dfrac{d}{dx}\left[\sin(x)\right]$.