LECTURE 10: PRACTICE PROBLEMS

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

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

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

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

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

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

- 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 $\dfrac{d}{dx}[\sin(x)]$.