Math 101(04) Solution
Quiz 2 4 October 2001

1. Let $h(x) = \sqrt{x}$. Find an expression for $m_{\text{sec}}(x)$, the slope of the secant line through the points $(4, h(4))$ and $(x, h(x))$. Simplify your expression as much as possible.

   Solution: The slope is the rise over the run. In this case, we have

$$m_{\text{sec}}(x) = \frac{\sqrt{x} - 2}{x - 4}.$$

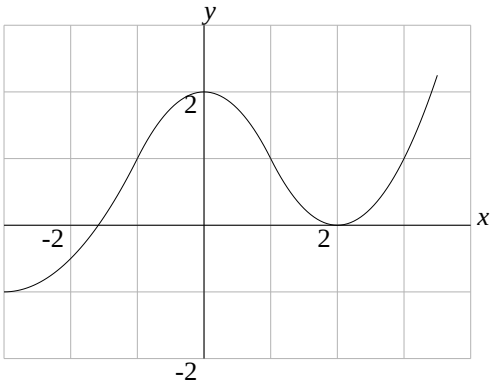
   We multiply top and bottom by $\sqrt{x} + 2$ to get

$$\begin{aligned} m_{\text{sec}}(x) &= \frac{x - 4}{(x - 4)(\sqrt{x} + 2)} \\ &= \begin{cases} \dfrac{1}{\sqrt{x} + 2} & \text{if } x \neq 4 \\ \text{undefined} & \text{if } x = 4. \end{cases} \end{aligned}$$

2. Sketch the graph of a continuous function $f$ satisfying

$$f'(-2) = 1, \quad f(0) = 2, \quad f'(0) = 0, \quad f(2) = 0, \quad f'(2) = 0.$$

   Here's one possibility:




3. If $g(t) = \dfrac{t^2}{t^3 + 1}$, find $g'(t)$. Don't simplify.

   Solution: Using the quotient rule, we get

$$g'(t) = \frac{2t(t^3 + 1) - t^2(3t^2)}{(t^3 + 1)^2}.$$