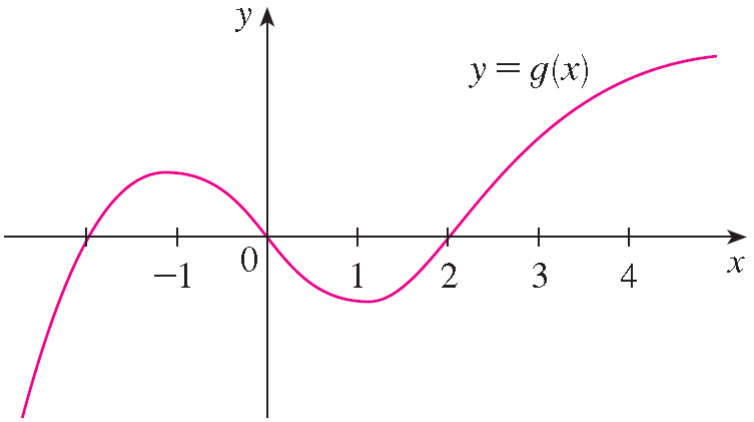
Worksheet 6 - Section 2.1

(1) Find an equation of the tangent line to the curve at the given point.

$$y = \sqrt{x}, \quad (1, 1)$$

(2) For the function g whose graph is given, arrange the following numbers in increasing order and explain your reasoning:

$$0 \qquad g'(-2) \qquad g'(0) \qquad g'(2) \qquad g'(4)$$



(3) If an equation of the tangent line to the curve $y = f(x)$ at the point where $a = 2$ is $y = 4x - 5$, find $f(2)$ and $f'(2)$.

(4) Sketch the graph of a function f for which $f(0) = 0$, $f'(0) = 3$, $f'(1) = 0$, and $f'(2) = -1$.

(5) Sketch the graph of a function g that is continuous on its domain $(-5, 5)$ and where $g(0) = 1$, $g'(-2) = 0$, $\lim_{x \to -5^+} g(x) = \infty$ and $\lim_{x \to 5^-} g(x) = \infty$.

(6) Find $f'(a)$.

(a) $f(t) = \frac{2t+1}{t+3}$

(b) $f(x) = \sqrt{1 - 2x}$

(7) Each limit represents the derivative of some function f at some number a. State f and a in each case.

(a) $\lim_{h \to 0} \frac{(1+h)^{10} - 1}{h}$

(b) $\lim_{x \to 5} \frac{2^x - 32}{x - 5}$

(c) $\lim_{h \to 0} \frac{\cos(\pi + h) + 1}{h}$

(d) $\lim_{h \to 0} \frac{\sqrt{9+h} - 3}{h}$

(8) Determine whether $f'(0)$ exists.

$$f(x) = \begin{cases} x \sin \frac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$