SECTION 2-7: DERIVATIVES AND RATES OF CHANGE

1. Given the curve $y = g(x)$,

   (a) Write an expression for the slope of the secant line through the points $P(8, g(8))$ and $Q(c, g(c))$.

   (b) Write an expression for the slope of the tangent line at $P(8, g(8))$.

   (c) Sketch a "cartoon" including $g(x)$, P and Q and use it to illustrate the computations in parts (a) and (b) above.

2. (a) **Fill in the boxes** The derivative of a function f at a number a is:

$$f'(a) = \lim_{h \to 0} \boxed{}$$

(b) Use the expression above to find $f'(2)$ for $f(x) = 6x - 3x^2$.

(c) Find $f(2)$.

(d) Use the answers to parts (a) and (b) to write an equation of the line tangent to $f(x)$ when $x = 2$.

(e) Sketch a "cartoon" including $f(x)$ and that tangent line. Is your answer in part (c) plausible?