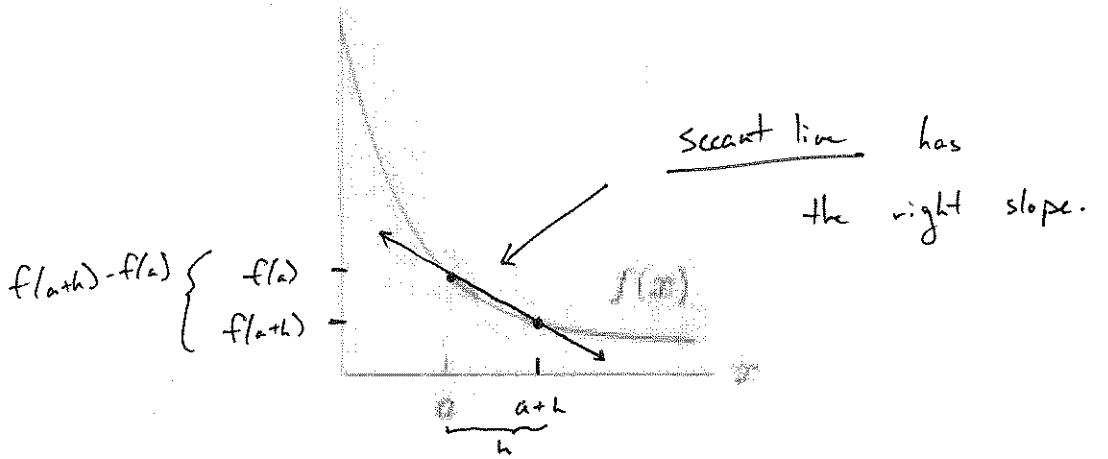
MTH 124 - Quiz 5
2 October 2013

Please answer the questions in the space provided. If you run out of room, use the back of the page. Show all your work to receive full credit. No books or notes are allowed for this quiz.

Name: Solutions

1. (3 points) Consider the following graph of a function:



Pick any $h > 0$, and illustrate on the graph the quantities

- h
- $a + h$
- $f(a)$
- $f(a + h)$
- $f(a + h) - f(a)$

Use these to represent the quantity $\frac{f(a+h)-f(a)}{h}$ as the slope of a line on the graph.

2. (3 points) Consider the function $g(t) = 3t^2 + t$.

(a) Use a point close to 0 to give an approximation for $g'(0)$.

(b) Use a point closer to 0 and give a better approximation for $g'(0)$.

a) Using 0.01:

$$g'(0) \approx \frac{g(0.01) - g(0)}{0.01} = \frac{3\cdot(0.01)^2 + 0.01 - 0}{0.01}$$

$$= \boxed{1.03}$$

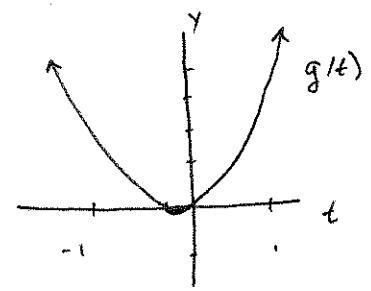
The true value is 1.

b) Using -0.001:

$$g'(0) \approx \frac{g(-0.001) - g(0)}{-0.001} = \frac{3\cdot(-0.001)^2 - 0.001}{-0.001}$$

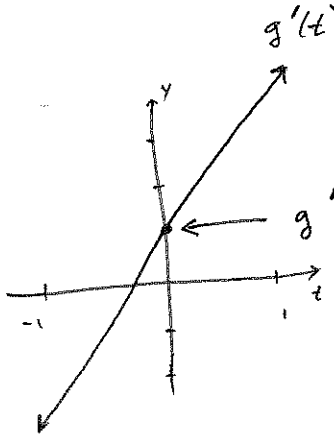
$$= 1 - 3\cdot(0.001) = \boxed{0.997}$$

3. (4 points) Graph the function $g(t) = 3t^2 + t$, and on a separate graph plot its derivative $g'(t)$. Clearly mark where g is increasing and decreasing, and explain how this affects the graph of the derivative g'.



decreasing increasing

g' negative g' positive



$g'(0) = 1$ from problem 2.

negative positive.