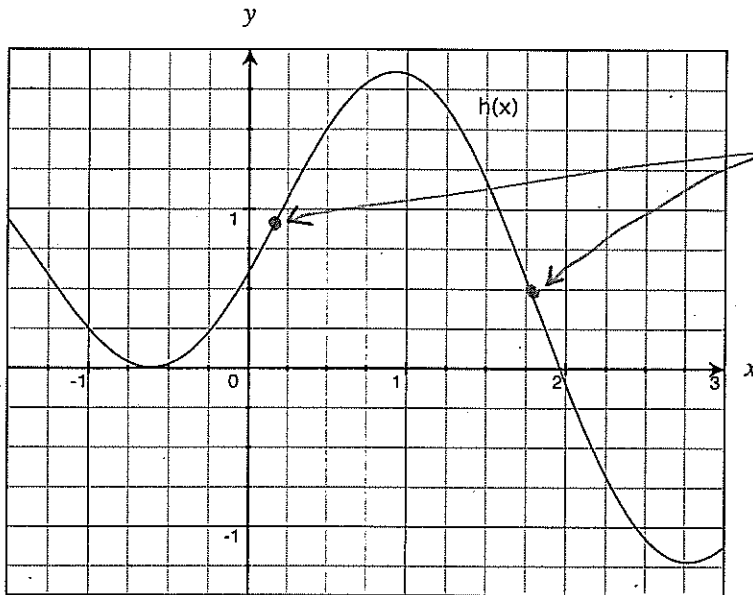


Name: Solutions

Math 105: Fall 2013
Quiz 3: September 27

Good Luck!

1. The graph of a function h is shown below. (Note: h has inflection points at $x = 0.2$ and $x = 1.8$. h has stationary points at $x = -0.6$, $x = 0.9$, and $x = 2.75$.)



Inflection points
i.e. where concavity
changes.

For which values of x , if any, is $h''(x)$:

- (a) positive? Justify your answer.

$$h''(x) > 0 \iff h(x) \text{ concave up}$$

so on the intervals $(-0.6, 0.2)$ and $(1.8, 2.75)$ $h''(x)$ is positive

- (b) zero? Justify your answer.

inflection points have $h''(x) = 0$ so

at $x = 0.2$ and $x = 1.8$

2. What does the difference quotient $\frac{f(a+h) - f(a)}{h}$ represent graphically?

$\frac{f(a+h) - f(a)}{h}$ is the slope of the secant line between the points $(a, f(a))$ and $(a+h, f(a+h))$

3. Let $f(x) = e^{-x}$.

(a) Fill in the missing entries in the table. (Round your answers to 4 decimal places.)

x	0.97	0.98	0.99	1
$f(x) = e^{-x}$	0.3791	0.3753	0.3716	0.3679

(b) Use the table above to estimate the missing entries in the table below. Show your work. (Round your answers to 4 decimal places.)

x	0.98	1
$f'(x)$	-0.38 or -0.37	-0.37

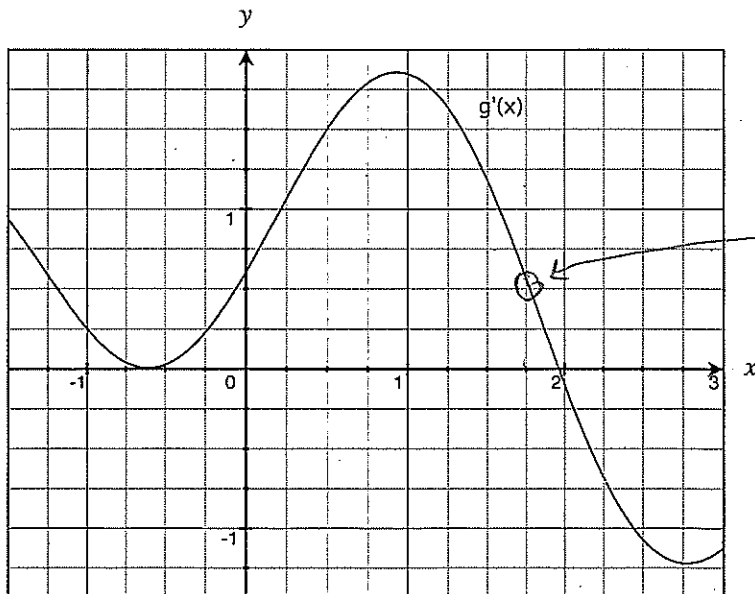
$$f'(0.98) \approx \frac{0.3753 - 0.3791}{0.98 - 0.97} = \frac{-0.0038}{0.01} = -0.38$$

$$\text{or } f'(0.98) = \frac{0.3716 - 0.3753}{0.99 - 0.98} = \frac{-0.0037}{0.01} = -0.37$$

$$f'(1) \approx \frac{0.3679 - 0.3716}{1 - 0.99} = \frac{-0.0037}{0.01} = -0.37$$

(notice: in this problem $f'(x) \approx -f(x)$)

4. The graph of $g'(x)$ is shown below. Use it to evaluate $\lim_{h \rightarrow 0} \frac{g(1.75 + h) - g(1.75)}{h} = g'(1.75)$



$(1.75, 0.5)$

$$\text{so } g'(1.75) = \boxed{0.5}$$