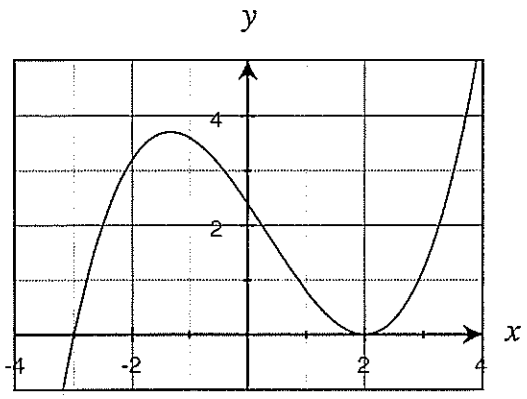
Name: Solutions

Math 105A: Fall 2012
Quiz 2: September 26

Please write your final answer in the space provided. Correct answers accompanied by incorrect or incomplete work will not receive full credit. **Justify all answers.** Good Luck!

1. The graph below is a graph of $y = g''(x)$.



(a) On what interval(s) is g' decreasing? Justify your answer.

(1a) $(-\infty, -3)$ or $(-3.2, -3)$

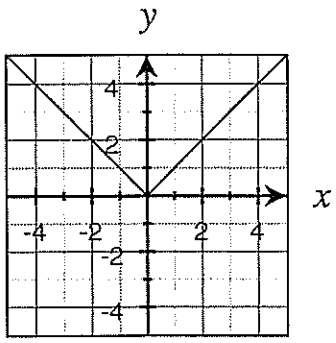
b/c g'' is negative valued the slope of g' is negative hence g' is decreasing

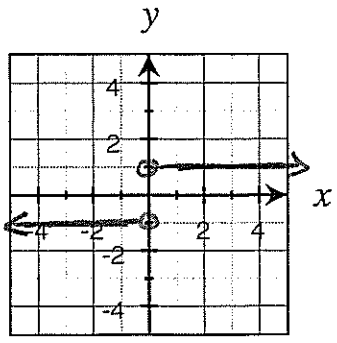
(b) For what x-value(s) does g have an inflection point? Justify your answer.

(1b) $x = -3$

g has an inflection point when the concavity changes. The concavity of g changes when the sign of g'' changes. The only place that happens is at $x=3$.

2. The graph below is a graph of $y = f(x)$. Sketch a graph of $f'(x)$.





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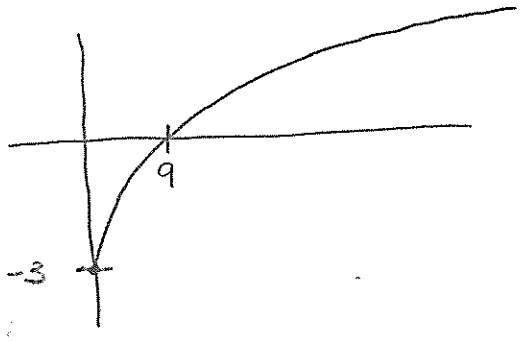
3. Let $h'(x) = \sqrt{x} - 3$.



(a) Is $h(x)$ increasing at $x = 1$? Justify your answer.

$h'(1) = \sqrt{1} - 3 = -2$

(3a) No b/c $h'(1)$ is negative the slope of $h(x)$ at $x=1$ is negative hence $h(x)$ is decreasing there.

(b) Is $h(x)$ concave up at $x = 4$? Justify your answer.

(3b) Yes

The slope of $h'(x)$ is positive at $x=4$, so $h''(4) > 0$, hence $h(x)$ is concave up.

(c) Why does $h(x)$ have a stationary point at $x = 9$?

b/c $h'(9) = \sqrt{9} - 3 = 0$ and stationary points are when $h'(a) = 0$.

(3c)

(d) Is the stationary point at $x = 9$ a local minimum, local maximum, or neither? Justify your answer.

(3d) local minimum

b/c $h'(x) < 0$ when $0 < x < 9$ $h(x)$ is decreasing from 0 to 9

and $h'(x) > 0$ when $9 < x$ so $h(x)$ is increasing from 9 to ∞.

Together this means $h(x)$ has a local minimum at $x = 9$.