Name: Solutions

Math 1300-005 - Spring 2017

Quiz 4 - 2/10/17

On my honor, as a University of Colorado at Boulder student, I have neither given nor received unauthorized assistance on this work.

Signature: _____

Guidelines: You are permitted to use notes, the book, in-class worksheets/solutions, and your classmates on this quiz. Computers and graphing technology of any kind, including calculators, are not allowed (exceptions made for those who have an e-book). Please show all work and clearly denote your answer.

1. Using the *limit definition of the derivative*, compute $f'(x)$ for $f(x) = \sqrt{1+2x}$. Do f and f' have the same domain? Why or why not?

(You will not have to do this on Midterm 2)

$$f'(x) = \lim_{h\to 0} \frac{\overbrace{\sqrt{1+2(x+h)}}^{f(x+h)} - \overbrace{\sqrt{1+2x}}^{f(x)}}{h} \cdot \frac{\left(\sqrt{1+2(x+h)} + \sqrt{1+2x}\right)}{\left(\sqrt{1+2(x+h)} + \sqrt{1+2x}\right)}$$

$$= \lim_{h\to 0} \frac{1+2(x+h) - (1+2x)}{h\left(\sqrt{1+2(x+h)} + \sqrt{1+2x}\right)}$$

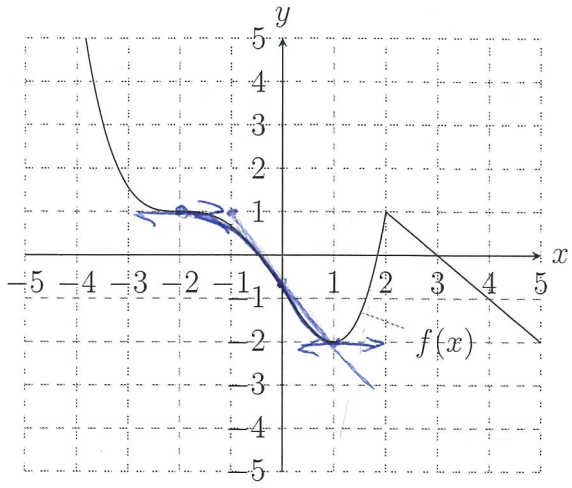
$$= \lim_{h\to 0} \frac{2\cancel{h}}{\cancel{h}\left(\sqrt{1+2(x+h)} + \sqrt{1+2x}\right)}$$

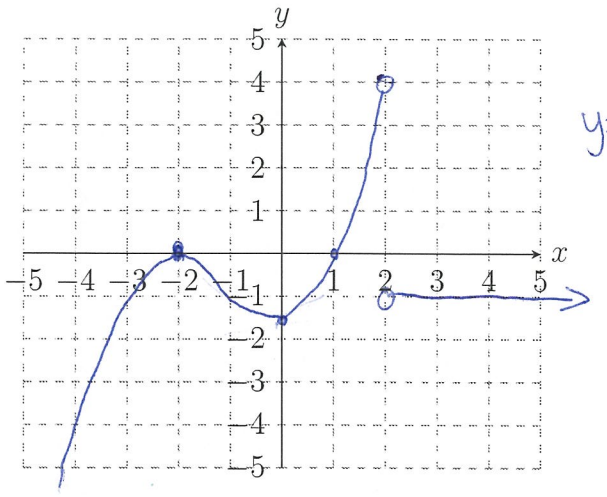
$$= \frac{2}{\sqrt{1+2x} + \sqrt{1+2x}}$$

$$= \boxed{\frac{1}{\sqrt{1+2x}}}$$

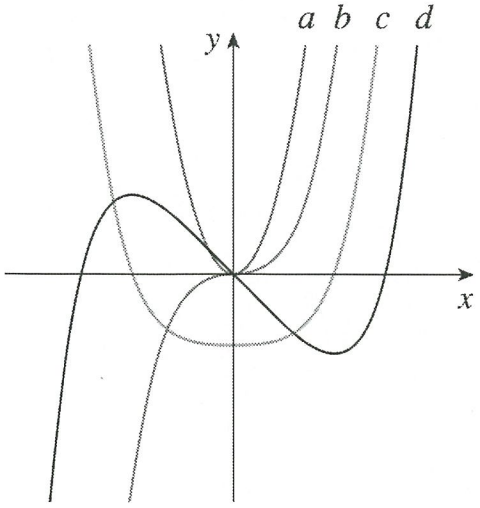
(You WILL have to do this on Midterm 2)

2. The graph of a function f is given. On the axes below, sketch a graph of f'.





3. The figure shows graphs of f, f', f'', and f'''. Identify each curve by stating which function corresponds to which letter.



$c = \frac{d}{dx}(d)$

$b = \frac{d}{dx}(c) = \frac{d^2}{dx^2}(d)$

$a = \frac{d}{dx}(b) = \frac{d^3}{dx^3}(d)$.

so $f = d$, $f' = c$, $f'' = b$, $f''' = a$