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Math 163A Homework Set #2

Due Friday, April 18, 2008

Problem:	1	2	3	4	5	Total
Score:						
Possible:	5	5	5	5	5	25

[1] (based on suggested problem 3.1#31)

(a) Using the limit rules, find $\lim_{x \rightarrow 7} \frac{x^2 - 49}{x - 7}$. (In each step, state what limit rule you used.)

(b) Let $f(x) = \frac{x^2 - 49}{x - 7}$ and $g(x) = x + 7$. Make side-by-side graphs of f and g on separate axes. Make your graphs large and neat, and be sure to put coordinates on all these key features:

- all axis intercepts
- any important points
- any holes

(c) Using your graphs, explain why the answer that you got in question (a) makes sense.

[2] (based on suggested problem 3.1#41) Find $\lim_{h \rightarrow 0} \frac{5(x+h)^3 - 5x^3}{h}$. Show your work.

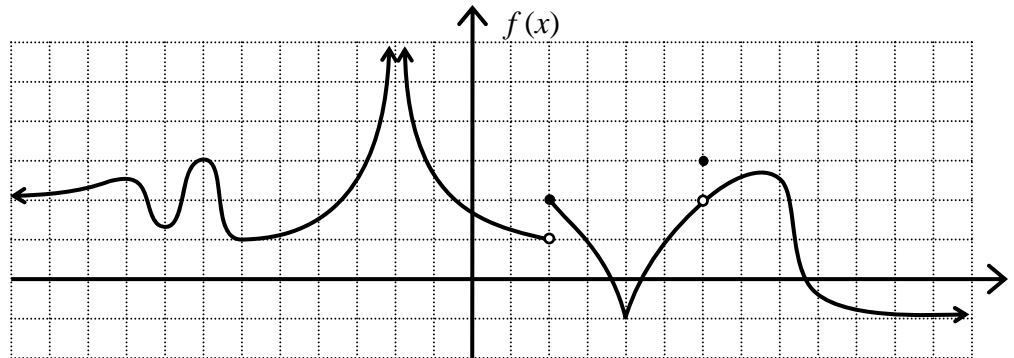
[3] (based on suggested problem 3.1#43) Let $f(x) = \frac{5x - 2}{3x + 7}$.

(a) Find $\lim_{x \rightarrow \infty} f(x)$. Explain.

(b) What does the value of this limit tell you about the end behavior of the graph of $f(x)$? (Explain.)

[4] (based on suggested problems 3.1#5,7,9,10,11 and 3.2#1,3,5)

Use the graph at right to answer the questions that follow.



(a) Give equations for all lines that are asymptotes. Also indicate whether each one is a vertical or horizontal asymptote.

(b) Find $\lim_{x \rightarrow 6} f(x)$. Explain.

(c) Find $\lim_{x \rightarrow \infty} f(x)$. Explain.

(d) Is f continuous at $a = 2$? Explain why or why not.

(e) Is f continuous at $a = 4$? Explain why or why not.

[5] (based on concepts discussed in class and in the reading)

(a) In Section 3.1, you learned that to find $\lim_{x \rightarrow 7} f(x)$ for a general function $f(x)$, it is *not* okay to simply substitute $x = 7$ into $f(x)$. Explain why.

(b) In Section 3.2, you learned that to find $\lim_{x \rightarrow 7} f(x)$ for $f(x) = 2x^3 + 5x + 7$, it is okay to simply substitute $x = 7$ into $f(x)$. Explain why.