CHAPTER 2 TEST

No calculators, no cell phones, kick it old school.

Math 231
October 6, 2008

Name: *key*

By printing my name I pledge to uphold the honor code.

1. Calculate each of the following limits. Show all work clearly and in order; how you get to your answer is even more important than the answer itself. If any limit does not exist, be as specific as possible as to how that occurs.

a) $\lim_{x\to 1} \frac{x-2}{x^2-3x+2}$ $= \lim_{x\to 1} \frac{\cancel{(x-2)}}{(x-1)\cancel{(x-2)}} = \lim_{x\to 1} \frac{1}{x-1} \to \frac{1}{0}$

18 pts

$\lim_{x\to 1^-} \frac{1}{x-1} \to \frac{1}{1^- - 1} \to \frac{1}{0^-} \to -\infty$

$\lim_{x\to 1^+} \frac{1}{x-1} \to \frac{1}{1^+ - 1} \to \frac{1}{0^+} \to \infty$

So $\lim_{x\to 1} \frac{1}{x-1}$ DNE.

b) $\lim_{x\to 2} \frac{x-2}{x^2-3x+2}$

18 pts

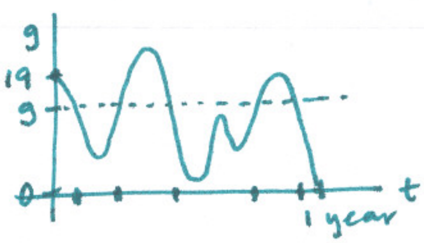
$= \lim_{x\to 2} \frac{\cancel{(x-2)}}{(x-1)\cancel{(x-2)}} = \lim_{x\to 2} \frac{1}{x-1} = \frac{1}{2-1} = \frac{1}{1} = 1$.

2. Explain in practical terms what the Intermediate Value Theorem says about the situation described below. (You may want to collect your thoughts before you start writing. Please do not make me want to hit myself in the head while I'm grading this.)

Let $g(t)$ be number of gallons of gas in Phil's new station wagon t days after he bought it. When Phil purchased the station wagon one year ago, the tank had 19 gallons of gas in it. Today he ran out of gas.

20 pts

for any real number of gallons $0 < g < 19$, there was some time over the last year when Phil had g gallons of gas.



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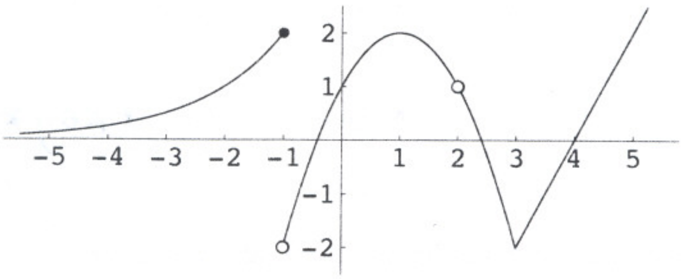
3. Suppose $f(x)$ is the function shown in the graph below. You should assume that the "ends" of the graph continue past the graphing window.



Determine whether each of the following statements is true (T) or false (F).

T F $\lim\limits_{x \to -1} f(x) = 2$

T F $\lim\limits_{x \to 1^-} f(x) = 2$

T F $\lim\limits_{x \to 1^+} f(x) = 2$

T F $\lim\limits_{x \to 1^+} f(x) = -2$

T F $\lim\limits_{x \to -2} f(x) = -1$

T F $\lim\limits_{x \to 2} f(x) = 1$

T F $\lim\limits_{x \to 3} f(x) = -2$

T F $\lim\limits_{x \to 0} f(x) = -\infty$

T F $\lim\limits_{x \to -\infty} f(x) = 5$

T F $\lim\limits_{x \to 1} f(x) = f(1)$

T F $\lim\limits_{x \to -1} f(x) = f(-1)$

T F $f(x)$ is defined on a punctured interval of radius 1 around $x = 2$.

T F $f(x)$ is left-continuous at $x = -1$.

T F $f(x)$ is right-continuous at $x = -1$.

T F $f(x)$ has a removable discontinuity at $x = -1$.

T F $f(x)$ is continuous at $x = 2$.

T F $f(x)$ is continuous at $x = 3$.

T F $f(x)$ is continuous on $(-1, 1)$.

T F $f(x)$ is continuous on $[0, 2]$.

T F If $0 < |x - 4| < 1$, then $|f(x) - 0| < 2$.

T F If $0 < |x - 2| < 1$, then $|f(x) - 1| < 1$.

T F If $0 < |x + 1| < 0.1$, then $|f(x) - 2| < 1$.

2 each
x 22 Q's

44 pts

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