Math 1A (7:30am – 8:20am)
Quiz 2 Version B
Fri Oct 1, 2010

NAME YOU ASKED TO BE CALLED: _____

SCORE: ___ / 30 POINTS

NO CALCULATORS ALLOWED

SHOW PROPER ALGEBRAIC WORK AND USE PROPER NOTATION

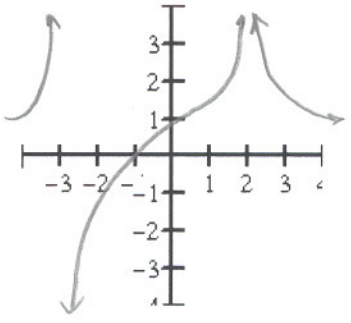
YOU DO NOT NEED TO SHOW THE USE OF THE LIMIT LAWS UNLESS SPECIFICALLY ASKED FOR

State the definition of "vertical asymptote". Write in complete sentences, using proper English and algebra. **SCORE: ___ / 2 POINTS**

SEE VERSION A KEY

Sketch the graph of a function f such that **SCORE: ___ / 2 POINTS**

$\lim_{x\to 2} f(x) = \infty$,
$\lim_{x\to -3^+} f(x) = -\infty$ and
$\lim_{x\to -3^-} f(x) = \infty$.



Let $f(x) = \begin{cases} 5-x, & \text{if } x<1 \\ x+3, & \text{if } 1<x<3 \\ 4, & \text{if } x=3 \\ 2x, & \text{if } x>3 \end{cases}$ **SCORE: ___ / 9 POINTS**

[a] Find $\lim_{x\to -2} f(x)$.

$= \lim_{x\to -2} (5-x) = 7$

[b] Find all values of x where f is not continuous. Justify your answers using the definition of continuity. **DO NOT USE A GRAPH.**

f IS NOT CONTINUOUS AT $x=1$ SINCE $f(1)$ DNE

$\lim_{x\to 3^-} f(x) = \lim_{x\to 3^-} (x+3) = 6$
$\lim_{x\to 3^+} f(x) = \lim_{x\to 3^+} 2x = 6$
} SO $\lim_{x\to 3} f(x) = 6$

BUT $f(3) = 4 \neq \lim_{x\to 3} f(x)$

SO f IS NOT CONTINUOUS AT $x=3$

CONTINUED ON OTHER SIDE

Find the following limits. **SCORE: ___ / 12 POINTS**

[a] $\lim_{t\to 2} \dfrac{4t^2-3t-12}{6-2t} = \dfrac{16-6-12}{6-4}$

$= \dfrac{-2}{2}$

$= -1$

[b] $\lim_{t\to 2} \dfrac{\frac{3}{t+4}-\frac{1}{t}}{t-2}$ $\quad \frac{0}{0}$

$= \lim_{t\to 2} \dfrac{\frac{3}{t+4}-\frac{1}{t}}{t-2} \cdot \dfrac{t(t+4)}{t(t+4)}$

$= \lim_{t\to 2} \dfrac{3t-(t+4)}{t(t-2)(t+4)}$

$= \lim_{t\to 2} \dfrac{2t-4}{t(t-2)(t+4)} \quad \dfrac{2}{1}$

$= \dfrac{2}{2(6)} = \dfrac{1}{6}$

[c] $\lim_{t\to 3} \dfrac{t-3}{2-\sqrt{3t-5}}$ $\quad \frac{0}{0}$

$= \lim_{t\to 3} \dfrac{t-3}{2-\sqrt{3t-5}} \cdot \dfrac{2+\sqrt{3t-5}}{2+\sqrt{3t-5}}$

$= \lim_{t\to 3} \dfrac{(t-3)(2+\sqrt{3t-5})}{4-(3t-5)}$

$= \lim_{t\to 3} \dfrac{(t-3)(2+\sqrt{3t-5})}{9-3t} \quad -3$

$= \dfrac{2+2}{-3} = -\dfrac{4}{3}$

If $f(-3) = g(-3) = 5$ and $\lim_{x\to -3} f(x) = 4$ and $\lim_{x\to -3} g(x) = -1$, find $\lim_{x\to -3}[xf(x) - 2g(x)]$. **SCORE: ___ / 3 POINTS**

NOTE: Show proper use of the limit laws to justify your answer. You do NOT need to name the laws.

$= \left(\lim_{x\to -3} x\right)\left(\lim_{x\to -3} f(x)\right) - 2\lim_{x\to -3} g(x)$

$= (-3)4 - 2(-1)$

$= -12 + 2$

$= -10$

State the definition of "continuous (at a point)". Write in complete sentences, using proper English and algebra. **SCORE: ___ / 2 POINTS**

SEE VERSION A KEY