Math 1A (7:30am – 8:20am)
Quiz 1 Version A
Fri Jan 14, 2011

What month is your birthday ? ___ ___
What are the first 2 digits of your address ? ___ ___
What are the last 2 digits of your zip code ? ___ ___
What are the last 2 digits of your DeAnza ID number ? ___ ___

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

Let $f(x)=\begin{cases}2x+15, & \text{if } x<-2\\ 3-4x, & \text{if } -2\le x<1\\ x-2, & \text{if } x>1\end{cases}$.

SCORE: ___ / 7 POINTS

[a] Is $f(x)$ continuous at $x=1$?
If yes, show that all three conditions of continuity are satisfied. If no, show that at least one condition is not satisfied.

1 NO. $f(1)$ DNE 1

[b] Is $f(x)$ continuous at $x=-2$?
If yes, show that all three conditions of continuity are satisfied. If no, show that at least one condition is not satisfied.

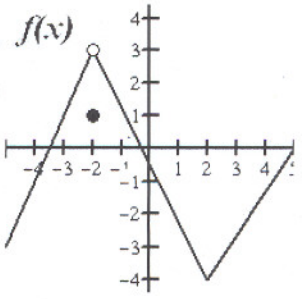
1 YES.
$\frac{1}{2}$ $f(-2)=2(-2)+15=11$
$\lim_{x\to -2^-} f(x)=\lim_{x\to -2^-}(2x+15)=11$
$\lim_{x\to -2^+} f(x)=\lim_{x\to -2^+}(3-4x)=11$ 1
$\frac{1}{2}$ $\lim_{x\to -2} f(x)=11=f(-2)$ 1

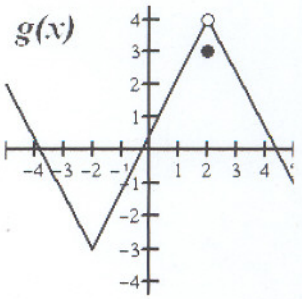
The graphs of f and g are shown on the right.

SCORE: ___ / 5 POINTS

Find $\lim_{x\to -2}[xf(x)-5g(x)]$, **showing the proper use of the limit laws to justify your answer.**

$=\lim_{x\to -2}[x f(x)]-\lim_{x\to -2}[5g(x)]$ 1
$=\lim_{x\to -2} x \lim_{x\to -2} f(x)-\lim_{x\to -2} 5 \lim_{x\to -2} g(x)$ 1
$=(-2)(3)-(5)(-3)$
$=9$ 2





State the complete definition of "vertical asymptote". **SCORE: ___ / 2 POINTS**

f HAS A VERTICAL ASYMPTOTE AT a

IF $\lim_{x\to a^+} f(x) = \infty$ OR $\lim_{x\to a^-} f(x) = \infty$ OR $\lim_{x\to a^+} f(x) = -\infty$

OR $\lim_{x\to a^-} f(x) = -\infty$

State the Squeeze Theorem. **SCORE: ___ / 2 POINTS**

IF $f(x) \le g(x) \le h(x)$ IN AN OPEN INTERVAL AROUND a (EXCEPT POSSIBLY AT a)

AND $\lim_{x\to a} f(x) = \lim_{x\to a} h(x) = L$ THEN $\lim_{x\to a} g(x) = L$

Evaluate the following limits. **SCORE: ___ / 14 POINTS**

The answer should be a number, ∞ or $-\infty$. **Write DNE only if the other possibilities do not apply.**

[a] $\lim_{t\to 3} \frac{t-3}{2-\sqrt{t^2-5}}$ $\frac{0}{0}$

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

$= \lim_{t\to 3} \frac{(t-3)(2+\sqrt{t^2-5})}{9-t^2}$ 1

$= \lim_{t\to 3} \frac{(t-3)(2+\sqrt{t^2-5})}{(3-t)(3+t)}$ 1 FOR FACTORING DENOMINATOR, 1 FOR CANCELLING

$= -\frac{4}{6}$

$= \boxed{-\frac{2}{3}}$ 1

[b] $\lim_{x\to 2^+} \frac{x^3-16}{2-x}$ $\frac{-8}{0^-}$ or $x^3-16 \to -8$, $2-x \to 0^-$

$= \infty$ 1

[c] $\lim_{x\to 4} \frac{\frac{6}{c-2}-3}{c-4}$ $\frac{0}{0}$ IGNORE – NOT REQUIRED

$= \lim_{c\to 4} \frac{6-3(c-2)}{(c-4)(c-2)}$

$= \lim_{c\to 4} \frac{12-3c}{(c-4)(c-2)}$ 1

$= \lim_{c\to 4} \frac{-3(c-4)}{(c-4)(c-2)}$ 1 FOR FACTORING NUMERATOR, 1 FOR CANCELLING

$= \boxed{-\frac{3}{2}}$ 1

[d] $\lim_{y\to -1} \frac{y^3-1}{3y^2+5y-12} = \frac{-2}{-14} = \frac{1}{7}$ 1, 1

SUBTRACT 1 POINT TOTAL IF YOU FORGOT ANY OF THESE