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

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

SEE 7:30 VERSION A

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

SEE 7:30 VERSION A

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

YES.

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

$\lim\limits_{x \to 1^-} f(x) = \lim\limits_{x \to 1^-} (3-4x) = -1$

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

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

[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.
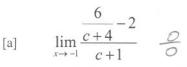
NO. $f(-2)$ DNE

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] $\displaystyle\lim_{x\to-1}\frac{\frac{6}{c+4}-2}{c+1}$ $\frac{0}{0}$

$=\displaystyle\lim_{c\to-1}\frac{6-2(c+4)}{(c+1)(c+4)}$

$=\displaystyle\lim_{c\to-1}\frac{-2c-2}{(c+1)(c+4)}$ | 1

$=\displaystyle\lim_{c\to-1}\frac{-2(c+1)}{(c+1)(c+4)}$ | 1 FOR FACTORING NUMERATOR
1 FOR CANCELLING

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

[b] $\displaystyle\lim_{y\to2}\frac{y^3+8}{2y^2+5y-12}=\frac{16}{6}=\frac{8}{3}$

(annotations: under 16 "1", under 6 "1", under 8 "1", under 3 "1")

(red squiggly note, with star and arrow): SUBTRACT 1 POINT TOTAL IF YOU FORGOT ANY OF THESE

[c] $\displaystyle\lim_{t\to4}\frac{t-4}{3-\sqrt{t^2-7}}$ $\frac{0}{0}$

$=\displaystyle\lim_{t\to4}\frac{(t-4)(3+\sqrt{t^2-7})}{9-(t^2-7)}$

$=\displaystyle\lim_{t\to4}\frac{(t-4)(3+\sqrt{t^2-7})}{16-t^2}$ | 1

$=\displaystyle\lim_{t\to4}\frac{(t-4)(3+\sqrt{t^2-7})}{(4-t)(4+t)}$ | 1 FOR FACTORING DENOMINATOR
1 FOR CANCELLING

$=-\frac{6}{8}$

$=-\frac{3}{4}$ | 1

[d] $\displaystyle\lim_{x\to3^+}\frac{x^3-18}{3-x}$ $\frac{9}{0^-}$ OR $\frac{x^3-18\to9}{3-x\to0^-}$

$=-\infty$

(annotations: under $\frac{9}{0^-}$ "1", under right side "1")

The graphs of f and g are shown on the right.   **SCORE: ___ / 5 POINTS**
Find $\displaystyle\lim_{x\to2}[5f(x)-xg(x)]$, **showing the proper use of the limit laws to justify your answer.**

$=\displaystyle\lim_{x\to2}[5f(x)]-\lim_{x\to2}[xg(x)]$ | 1

$=\displaystyle\lim_{x\to2}5\lim_{x\to2}f(x)-\lim_{x\to2}x\lim_{x\to2}g(x)$ | 1

$=5(-4)-2(4)$ | 1

$=-28$ | 2

$f(x)$ *(graph)*

$g(x)$ *(graph)*