Math 1A (9:30am – 10:20am)
Quiz 2 Version A
Fri Jan 15, 2009

SCORE: ___ / 20 POINTS

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 social security number ? ___ ___
[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER, USE YOUR STUDENT ID NUMBER]

NO CALCULATORS ALLOWED

For the function whose graph is given, state the value of each quantity.
Each answer should be a number, ∞, $-\infty$, or "**DNE**" if none of the other three answers apply.

SCORE: ___ / 2 POINTS

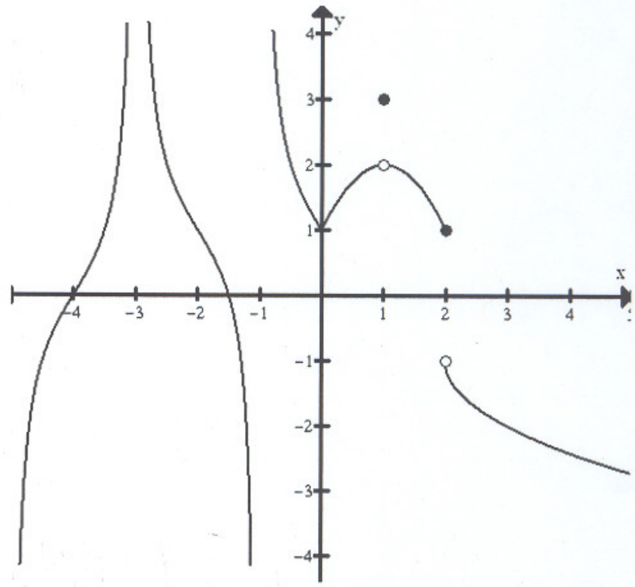
[a] $\lim_{x\to 2} f(x) = \boxed{\text{DNE}}$

[b] $\lim_{x\to 1} f(x) = \boxed{2}$

[c] $\lim_{x\to -1^-} f(x) = \boxed{-\infty}$

$\frac{1}{2}$ EACH

[d] $f(-3) = \boxed{\text{DNE}}$



State the formal definition of a limit.

SCORE: ___ / 3 POINTS

CONTINUED ON OTHER SIDE ➔

Evaluate the following limits. **JUSTIFY EACH ANSWER WITH ALGEBRA AND/OR REASONING.** Each answer should be a number, ∞, $-\infty$, or "**DNE**" if none of the other three answers apply.

SCORE: ___ / 15 POINTS

[a] $\lim_{x\to 2^-} \frac{x^2-5x-6}{x-2} = \boxed{\infty}$ 1

AS $x \to 2^-$, $x^2-5x-6 \to \boxed{-12}$ 1

$x-2 \to \boxed{0^-}$ 1

[b] $\lim_{x\to 1} \frac{\frac{2}{x+1}-1}{2x-2} = \lim_{x\to 1} \frac{\frac{2}{x+1}-1}{2(x-1)} \cdot \frac{(x+1)}{(x+1)}$

$\frac{0}{0}$

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

2 1

$= \lim_{x\to 1} \frac{\cancel{1-x}\,-1}{2\cancel{(x-1)}(x+1)} = \boxed{\lim_{x\to 1} \frac{-1}{2(x+1)}} = \boxed{\frac{-1}{4}}$

[c] $\lim_{x\to -3} \frac{2x+6}{2-\sqrt{1-x}} = \lim_{x\to -3} \frac{2(x+3)}{2-\sqrt{1-x}} \cdot \frac{2+\sqrt{1-x}}{2+\sqrt{1-x}}$

$\frac{0}{0}$

$= \lim_{x\to -3} \frac{2(x+3)(2+\sqrt{1-x})}{4-(1-x)}$

2 1

$= \lim_{x\to -3} \frac{2\cancel{(x+3)}(2+\sqrt{1-x})}{\cancel{3+x}} = \boxed{\lim_{x\to -3} 2(2+\sqrt{1-x})} = \boxed{8}$

[d] If $f(x) = \begin{cases} 2x+3 & \text{if } x \le 1 \\ 4+x^2 & \text{if } 1 < x < 3 \\ 4x-1 & \text{if } x > 3 \end{cases}$, $\lim_{x\to 3} f(x) = \boxed{\text{DNE}}$ 1

$\lim_{x\to 3^-} f(x) = \boxed{\lim_{x\to 3^-} (4+x^2) = 13}$ 1

$\lim_{x\to 3^+} f(x) = \boxed{\lim_{x\to 3^+} (4x-1) = 11}$ 1

[e] If $2x-3 < f(x) < 3+\sqrt{x}$ for $x \ge 0$, $\lim_{x\to 4} f(x) = \boxed{5}$ $\frac{1}{2}$

$\boxed{\lim_{x\to 4} (2x-3) = 5}$ 1

$\boxed{\lim_{x\to 4} (3+\sqrt{x}) = 5}$ 1

$\frac{1}{2}$

BY $\boxed{\text{SQUEEZE THEOREM}}$, $\lim_{x\to 4} f(x) = 5$