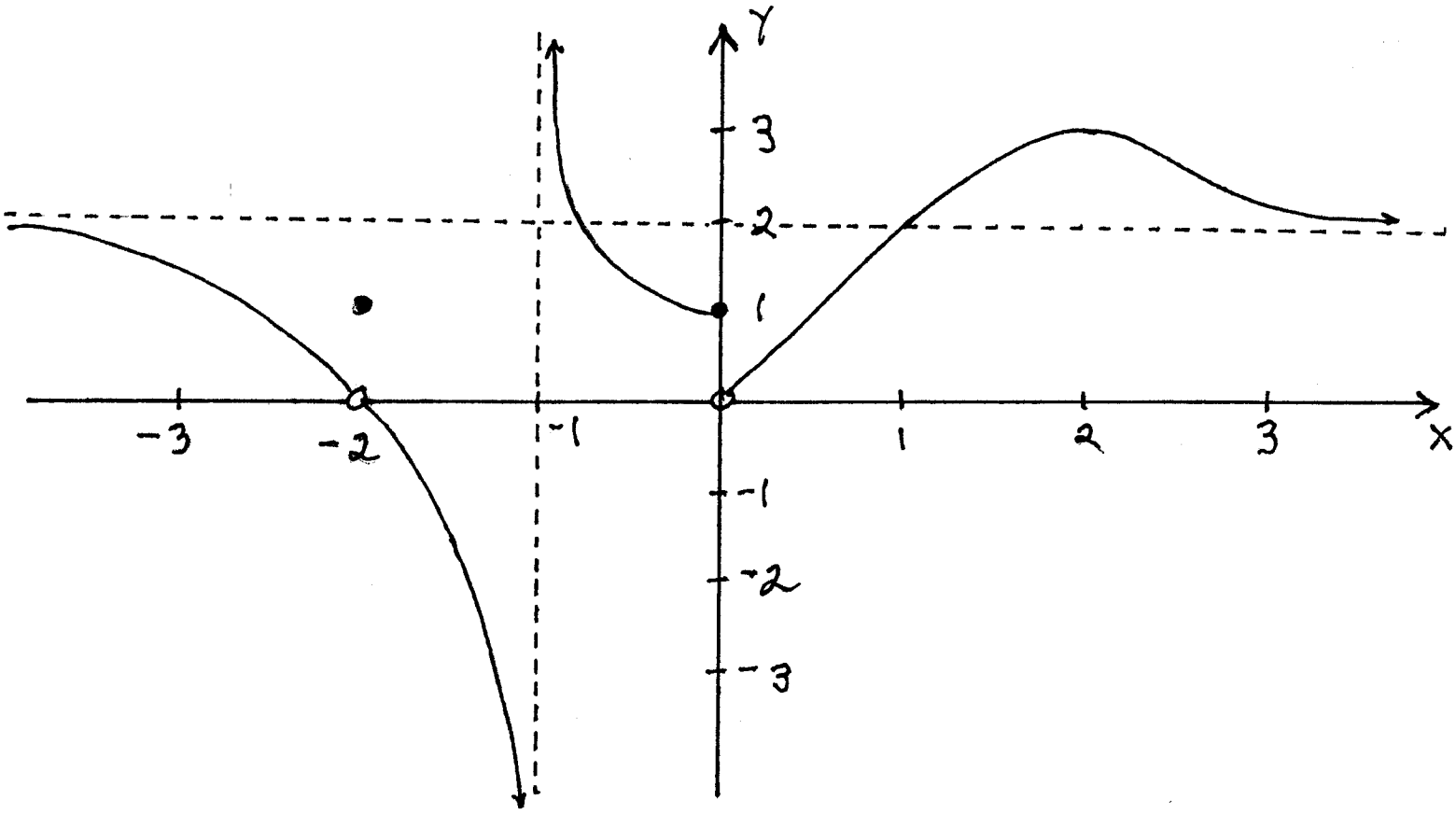
Math 16A (Summer 2010)
Kouba
Quiz 2

PRINT Name : KEY

Exam ID # : _____

1.) (2 pts. each) Use the given graph to determine the following limits



a.) $\lim_{x \to 1} f(x) = 2$

b.) $\lim_{x \to -2} f(x) = 0$

c.) $\lim_{x \to 0^+} f(x) = 0$

d.) $\lim_{x \to 0^-} f(x) = 1$

e.) $\lim_{x \to 0} f(x)$ DNE

f.) $\lim_{x \to -1^+} f(x) = +\infty$

g.) $\lim_{x \to -1^-} f(x) = -\infty$

h.) $\lim_{x \to 2} f(x) = 3$

i.) $\lim_{x \to \infty} f(x) = 2$

j.) $\lim_{x \to -\infty} f(x) = 2$

2.) (5 pts. each) Determine the following limits.

a.) $\lim_{x\to 2} \frac{x^2+x-6}{x^2-4}$ $\overset{\text{"}\frac{0}{0}\text{"}}{=}$ $\lim_{x\to 2} \frac{(x-2)(x+3)}{(x-2)(x+2)} = \frac{5}{4}$

b.) $\lim_{x\to 3} \frac{\frac{1}{x}-\frac{1}{3}}{x-3}$ $\overset{\text{"}\frac{0}{0}\text{"}}{=}$ $\lim_{x\to 3} \frac{\frac{3}{3x}-\frac{x}{3x}}{\frac{x-3}{1}}$

$= \lim_{x\to 3} \frac{3-x}{3x} \cdot \frac{1}{x-3} = \lim_{x\to 3} \frac{-(x-3)}{3x\cdot(x-3)}$

$= \frac{-1}{9}$

c.) $\lim_{x\to -1} \frac{\sqrt{x+5}-2}{x+1} \cdot \frac{\sqrt{x+5}+2}{\sqrt{x+5}+2}$ $\overset{\text{"}\frac{0}{0}\text{"}}{=}$ $\lim_{x\to -1} \frac{(x+5)-4}{(x+1)(\sqrt{x+5}+2)}$

$= \lim_{x\to -1} \frac{x+1}{(x+1)(\sqrt{x+5}+2)} = \frac{1}{\sqrt{4}+2} = \frac{1}{4}$

3.) Consider the function $y = \dfrac{2x-2}{x+1}$.

a.) (4 pts.) Find the x- and y-intercepts for the function.

$x=0: \quad y=-2$

$y=0: \quad \dfrac{2x-2}{x+1} = 0 \rightarrow 2x-2=0$

$\rightarrow x=1$

b.) (4 pts.) Use limits to find equations for all vertical asymptotes.

$\lim\limits_{x\to -1^+} \dfrac{2x-2}{x+1} = \dfrac{"-4"}{0^+} = -\infty$

$\lim\limits_{x\to -1^-} \dfrac{2x-2}{x+1} = \dfrac{"-4"}{0^-} = +\infty$ so

V.A. is $\boxed{x=-1}$

c.) (4 pts.) Use limits to find equations for all horizontal asymptotes.

$\lim\limits_{x\to \pm\infty} \dfrac{2x-2}{x+1} \overset{"\frac{\infty}{\infty}"}{=} \lim\limits_{x\to \pm\infty} \dfrac{2x-2}{x+1} \cdot \dfrac{\frac{1}{x}}{\frac{1}{x}}$

$= \lim\limits_{x\to \pm\infty} \dfrac{2-\frac{2}{x}}{1+\frac{1}{x}} = \dfrac{2-0}{1+0} = 2$

so H.A. is $\boxed{y=2}$

d.) (3 pts.) Use results from a., b., and c. to sketch the graph of the function. Label your graph appropriately.