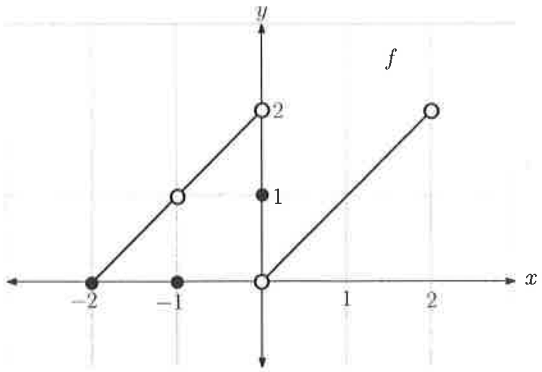
Score: ______ out of 10.

Math 201 - Quiz #2 Name: Key

1. Use the graph of the given function $y = f(x)$ below to compute the following limits (if they exist):



(a) $\lim_{x \to -1^-} f(x) = \boxed{1}$

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

(c) $\lim_{x \to -1} f(x) = \boxed{1}$

(d) $\lim_{x \to 0^-} f(x) = \boxed{2}$

(e) $\lim_{x \to 0^+} f(x) = \boxed{0}$

(f) $\lim_{x \to 0} f(x) = \boxed{\text{DNE}}$ (Since these two are not the same)

2. (a) $\lim_{x \to -5^+} \frac{7+x}{x+5} = \boxed{+\infty}$

Numerator goes to +2

Denominator goes to 0 AND is +

(b) Part (a) shows that the function $f(x) = \frac{7+x}{x+5}$ has a vertical asymptote at $x = \boxed{-5}$

3. If $r(x) = \frac{f(x)}{g(x)}$ and $g(x) = 0$, then there is a vertical asymptote at x. Circle one: True False

There could be a hole in the graph

4. **Pick ONE of the following (please circle which one you will solve).** Otherwise, I will grade the first one you work on. You must show work on this problem.

(a) $\lim_{x \to -3} \frac{x^2 - 9}{x^2 + 5x + 6}$

(b) $\lim_{x \to 7} \frac{\sqrt{x+2} - 3}{x - 7}$

(c) $\lim_{x \to -4} \frac{\frac{1}{4} + \frac{1}{x}}{4 + x}$

See next page for solutions.

Please put your final answer in this box $\longrightarrow$ $\boxed{}$

(a) $$\lim_{x\to -3} \frac{x^2-9}{x^2+5x+6} = \lim_{x\to -3} \frac{\cancel{(x+3)}(x-3)}{\cancel{(x+3)}(x+2)}$$

$$= \lim_{x\to -3} \frac{x-3}{x+2} = \frac{-3-3}{-3+2} = \frac{-6}{-1}$$

$$= \boxed{6}$$

(b) $$\lim_{x\to 7} \left(\frac{\sqrt{x+2}-3}{x-7}\right)\left(\frac{\sqrt{x+2}+3}{\sqrt{x+2}+3}\right)$$

$$= \lim_{x\to 7} \frac{(\sqrt{x+2})^2 - \cancel{3\sqrt{x+2}} + \cancel{3\sqrt{x+2}} - 9}{(x-7)(\sqrt{x+2}+3)}$$

$$= \lim_{x\to 7} \frac{x+2-9}{(x-7)(\sqrt{x+2}+3)}$$

$$= \lim_{x\to 7} \frac{\cancel{(x-7)}}{\cancel{(x-7)}(\sqrt{x+2}+3)} = \lim_{x\to 7} \frac{1}{\sqrt{x+2}+3}$$

$$= \frac{1}{\sqrt{9}+3} = \frac{1}{3+3} = \boxed{\frac{1}{6}}$$

(c) $$\lim_{x\to -4} \frac{\frac{1}{4}+\frac{1}{x}}{4+x} = \lim_{x\to -4} \frac{\frac{x+4}{4x}}{\frac{4+x}{1}} = \lim_{x\to -4} \left(\frac{\cancel{x+4}}{4x}\right)\left(\frac{1}{\cancel{4+x}}\right)$$

$$= \lim_{x\to -4} \frac{1}{4x} = \boxed{\frac{-1}{16}}$$