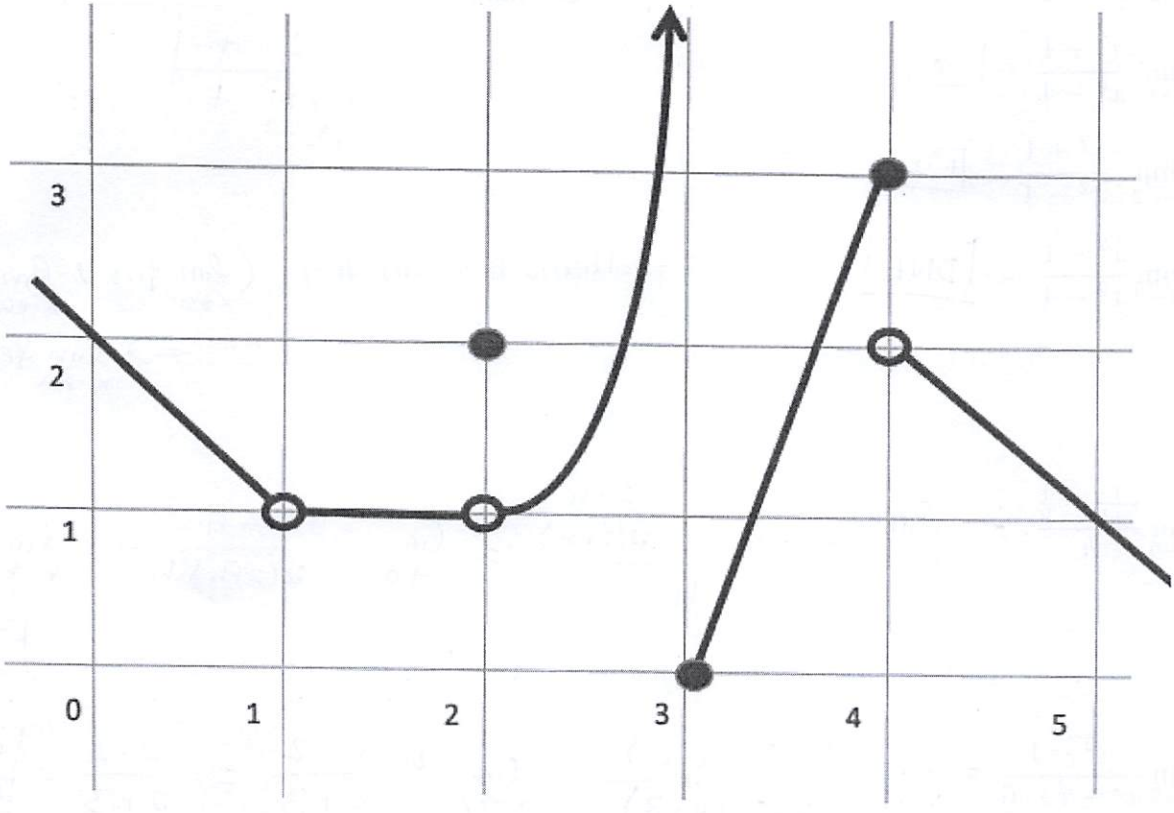
Worksheet 2 500 / 15 points

Name: Batman Section: 5 6

f(0)= 2
f(1)= Not Defined
f(2)= 2
f(3)= 0
f(4)= 3
f(5)= 1

$\lim_{x\to 0} f(x) = 2$
$\lim_{x\to 1} f(x) = 1$
$\lim_{x\to 2} f(x) = 1$
$\lim_{x\to 3} f(x) = \text{DNE}$
$\lim_{x\to 4} f(x) = \text{DNE}$
$\lim_{x\to 5} f(x) = 1$

$\lim_{x\to 1^+} f(x) = 1$
$\lim_{x\to 3^-} f(x) = +\infty$
$\lim_{x\to 3^+} f(x) = 0$
$\lim_{x\to 4^-} f(x) = 3$
$\lim_{x\to 4^+} f(x) = 2$



Find the following limits, if they exist:

1. $\lim_{x\to 2} \dfrac{x^2-4}{x^2+4} = \dfrac{2^2-4}{2^2+4} = \boxed{0}$

2. $\lim_{x\to 2} \dfrac{x^2-4}{x-2} = \lim_{x\to 2} \dfrac{(x+2)(x-2)}{(x-2)} = \lim_{x\to 2} x+2 = \boxed{4}$

3. $\lim_{x\to 2^+} \dfrac{x^2+1}{x^2-4}$ "$\frac{\#\neq 0}{0}$" + one sided limit $\Rightarrow \pm\infty$ Ans: $+\infty$ (via chart)

4. $\lim_{x\to 2^-} \dfrac{x^2+1}{x^2-4} = \boxed{-\infty}$ (via chart)

5. $\lim_{x\to -2^-} \dfrac{x^2+1}{x^2-4} = \boxed{+\infty}$ (chart)

		-2		2
x^2+1	+		+	
x^2-2	+		−	
$\frac{x^2+1}{x^2-2}$	+		−	

6. $\lim_{x\to 2} \dfrac{x^2+1}{x^2-4} = \boxed{\text{DNE}}$ from problems #3 and #4 ($\lim_{x\to a^+} f(x) \neq \lim_{x\to a^-} f(x) \Rightarrow \lim_{x\to a} f(x)$ DNE)

7. $\lim_{h\to 0} \dfrac{\frac{1}{2+h} - \frac{1}{2}}{h} = \lim_{h\to 0} \dfrac{\frac{2}{2(2+h)} - \frac{2+h}{2(2+h)}}{h} = \lim_{h\to 0} \dfrac{-h}{2(2+h)h} = \lim_{h\to 0} \dfrac{-1}{2(2+h)} = \boxed{\dfrac{-1}{4}}$

8. $\lim_{x\to 2} \dfrac{x^2-4}{x^2+x-6} = \lim_{x\to 2} \dfrac{(x+2)(x-2)}{(x-2)(x+3)} = \lim_{x\to 2} \dfrac{x+2}{x+3} = \dfrac{2+2}{2+3} = \boxed{\dfrac{4}{5}}$

9. $\lim_{\theta\to -1} \dfrac{\theta^2-2\theta-3}{\theta^2+3\theta+2} = \lim_{\theta\to -1} \dfrac{(\theta-3)(\theta+1)}{(\theta+2)(\theta+1)} = \lim_{\theta\to -1} \dfrac{\theta-3}{\theta+2} = \dfrac{-4}{1} = \boxed{-4}$

10. $\lim_{x\to 3} \dfrac{\sqrt{2x+3}-3}{x-3} \left(\dfrac{\sqrt{2x+3}+3}{\sqrt{2x+3}+3}\right) = \lim_{x\to 3} \dfrac{2x+3-9}{(x-3)(\sqrt{2x+3}+3)} = \lim_{x\to 3} \dfrac{2(x-3)}{(x-3)(\sqrt{2x+3}+3)} = \dfrac{2}{6} = \boxed{\dfrac{1}{3}}$