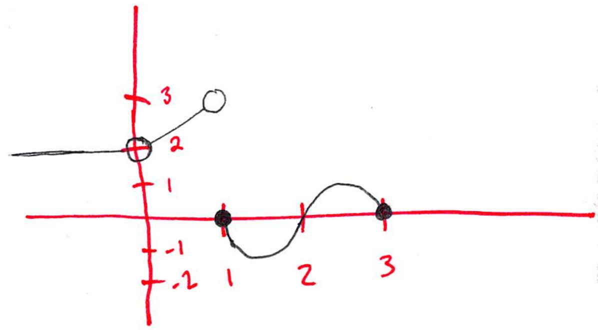
251 - Worksheet 2

Name: Curlee's Solutions

Draw a graph of the following function:

$$f(x) = \begin{cases} 2 & x < 0 \\ x+2 & 0 < x < 1 \\ \sin(\pi x) & 1 \le x \le 3 \end{cases}$$



Now, use your graph to determine the following (if they exist):

$f(0) =$ undefined

$\lim_{x\to 0} f(x) = 2$ $\lim_{x\to .5} f(x) = 2.5$

$\lim_{x\to 1} f(x) =$ DNE $\lim_{x\to 2} f(x) = 0$

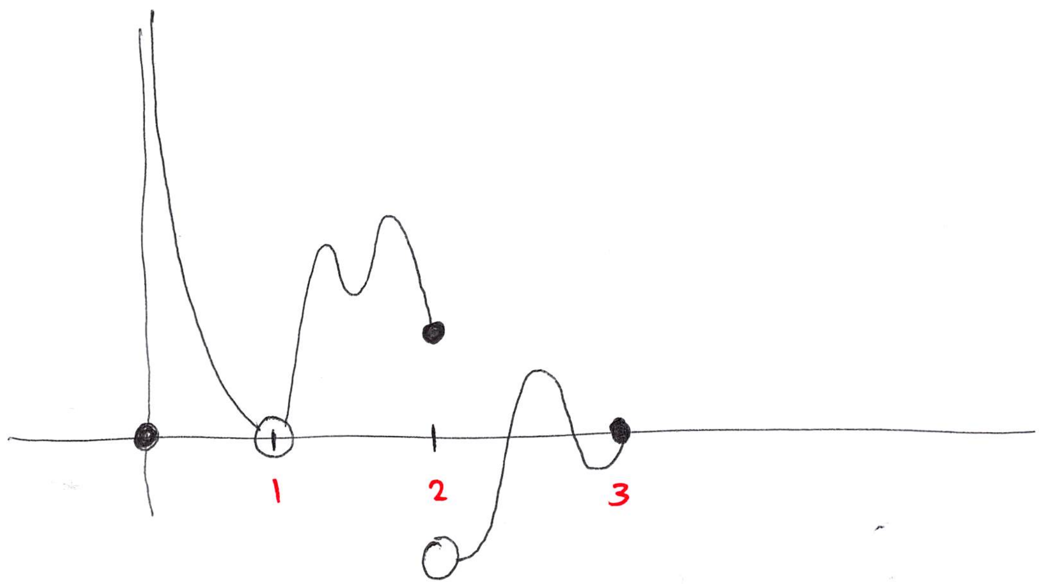
Draw a graph of a function, call it $g(x)$, with the following properties:

$\lim_{x\to 1} g(x) = 0$

$\lim_{x\to 2} g(x) = DNE$,

$g(x)$ is not defined at $x = 1$, $g(2) = 1$, $g(0) = 0$, $g(3) = 0$.

Here is one possible graph:



Determine the following:

$$\lim_{x\to 2}\frac{x^2+6x-7}{x^2-1} = \frac{4+12-7}{4-1} = 3$$

$$\lim_{x\to 1}\frac{x^2+6x-7}{x^2-1} = \lim_{x\to 1}\frac{(x+7)(x-1)}{(x+1)(x-1)} = \lim_{x\to 1}\frac{x+7}{x+1} = \frac{1+7}{1+1} = 4$$

$$\lim_{x\to -7}\frac{x^2+6x-7}{x^2-1} = \lim_{x\to -7}\frac{x+7}{x+1} = \frac{0}{-6} = 0$$

$$\lim_{x\to -1}\frac{x^2+6x-7}{x^2-1} = \underline{\underline{\text{DNE}}} \text{ because } \frac{\text{num.} \neq 0}{\text{denom} = 0}.$$

stay tuned for complete solution!

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

$$= \lim_{x\to 1} x^2+x+1$$

$$= 3$$