TMATH 124pm: Quiz 1

Key

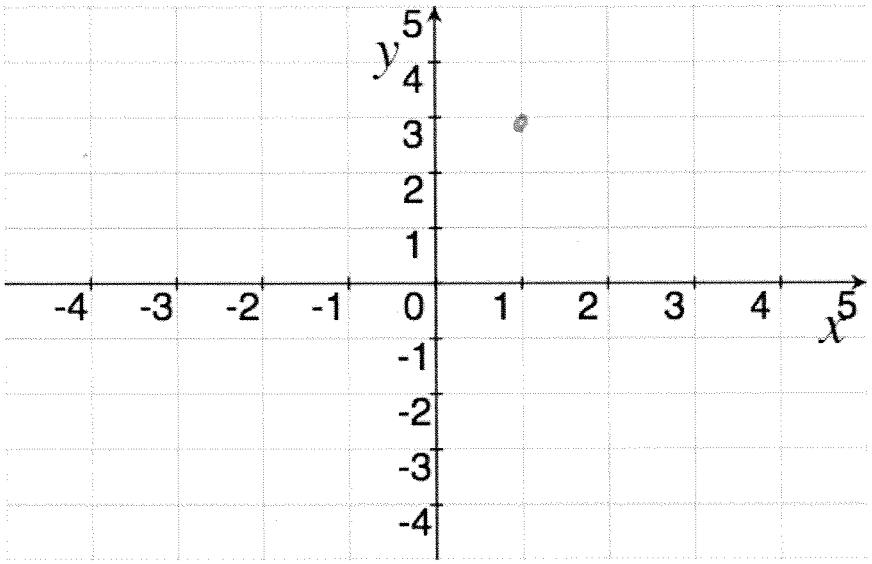
Show *all* your work (numerically, algebraically, or geometrically) for each and simplify. No credit is given without supporting work.

1. [3] (§2.2 #15) Sketch the graph of an example function f that satisfies the following conditions:

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

   (b) $f(1) = 3$ (+1)

   (c) $\lim_{x\to -2} f(x) = \infty$ (+1)



2. [2] (WebHW2 #9 & §2.2 #19) Determine the following, if they exist:

   $\lim_{x\to 6} \dfrac{7-x}{(x-6)^2}$ stays positive gets super small but positive

x	5.9	5.99	...	6.01	6.1
$\frac{7-x}{(x-6)^2}$	$\frac{1.1}{.01}$	$\frac{1.01}{.0001}$		9999.90	
	110	10100			

So $\lim_{x\to 6} \dfrac{7-x}{(x-6)^2} = \infty$

table (+5) reasoning/got it (+5) = alg/limit prop (+5) reasoning/got it (+5)

$\lim_{x\to 2^+} \dfrac{x\ln(x) - \ln(x)}{x^2-1} = \lim_{x\to 2^+} \dfrac{\ln(x)(x-1)}{(x+1)(x-1)}$

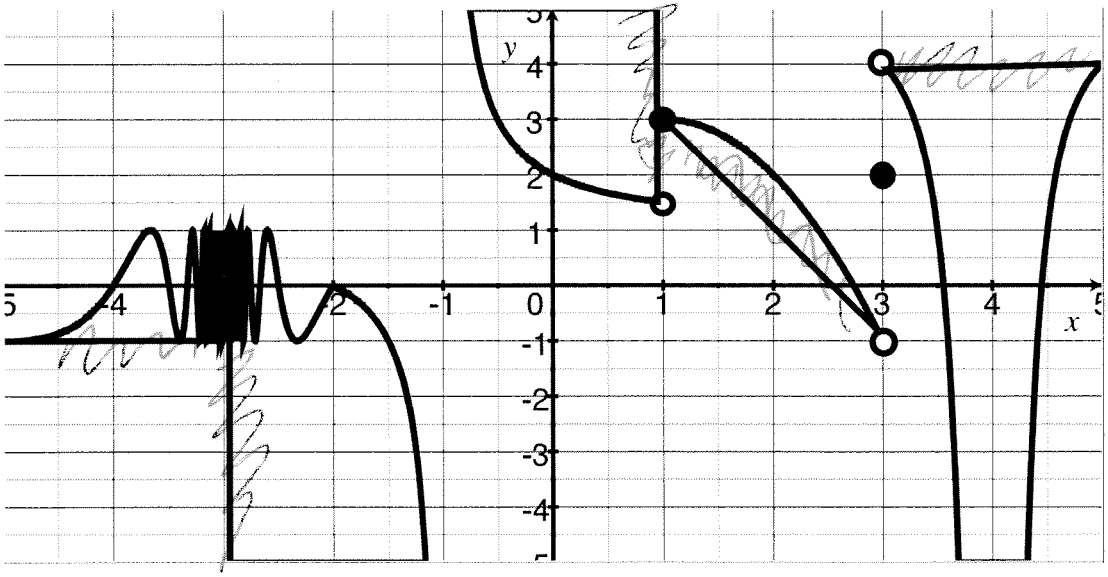
notice 2 is in the domain of $\frac{x-1}{x^2-1}$ so by Pamela's Law

limit Law #4 $= \lim_{x\to 2^+} \ln(x) \cdot \lim_{x\to 2^+} \dfrac{x-1}{x^2-1}$

$= \ln(2) \cdot \dfrac{2-1}{4-1}$

$= \dfrac{1}{3}\ln(2)$

3. [5] For the function R whose graph is given, state the value of each quantity, it it exists.



$\lim_{x \to 0} R(x)$

$= 2$

(+1)

$\lim_{x \to 1} R(x)$

does not exist

(+1)

$\lim_{x \to 1^-} R(x)$ $= 1.5$

(+1)

note: the 2-sided limit does not exist bc the sides

$\lim_{x \to -3} R(x)$

does not exist.

$\lim_{x \to 4^+} R(x)$

$= \infty$