TMATH 124: Quiz 1

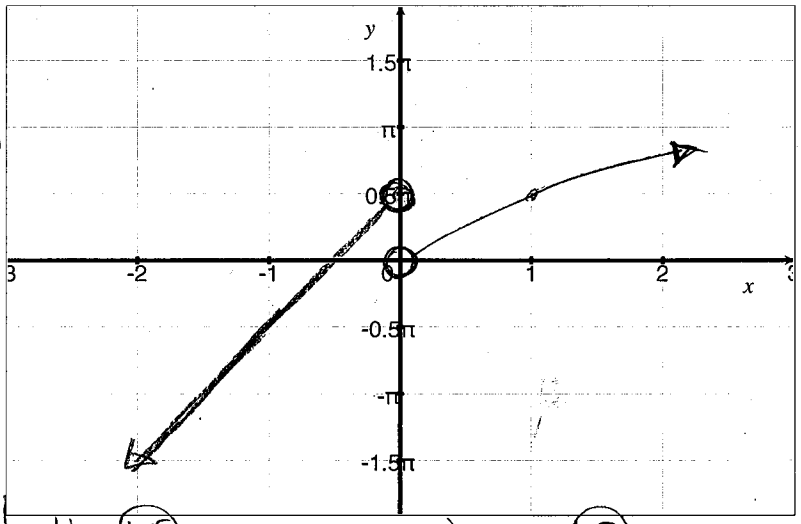
Key

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

1. Let $f(x) = \begin{cases} \pi x + \frac{\pi}{2} & \text{if } x < 0 \\ 2\arctan(x) & \text{if } 0 < x \end{cases}$

line w/ slope π & y-intercept of $\frac{\pi}{2}$
arctan vertically stretched by 2

(a) [3] *Carefully* graph f on the axis provided



note
$2\arctan(1) = 2(\pi/4) = \pi/2$
domain (+1)

line (+.5) right line (+.5)
shape (+.5) right shape (+.5)

(b) [1] (§2.2 #12) Determine the values of c for which $\lim_{x \to c} f(x)$ exists.

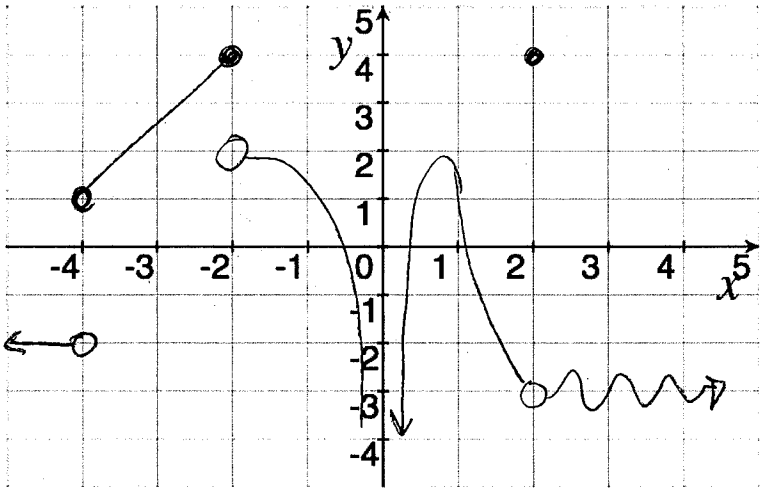
note 0 (+.5) got it (+.5)

all c except when $c=0$
— or —
$(-\infty, 0)$ AND $(0, \infty)$
— or —
$c \neq 0$

2. [3] (Day 1) Draw a function g such that both conditions are met:

(+1) (a) $\lim_{x \to 2} g(x) = -3$

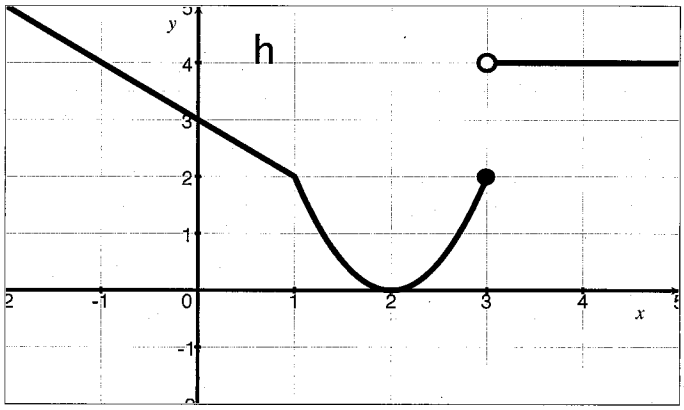
(+1) (b) $g(2) = 4$



(+1)

Note: there are MANY correct answers?

3. [3] (WebHW2 #1 & Day 2) For the function h whose graph is given, estimate the value of each quantity, if it exists.



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

2

(+1)

$\lim_{x \to 3^+} h(x)$

4

(+1)

partial +.5 if 2

$\lim_{x \to -1} \sqrt{5h(x) + 5}$

$= \sqrt{\lim_{x \to -1} (5h(x) + 5)}$

$= \sqrt{\lim_{x \to -1} 5h(x) + \lim_{x \to -1} 5}$

$= \sqrt{5 \lim_{x \to -1} h(x) + 5}$

$= \sqrt{5 \cdot 4 + 5}$

$= \sqrt{20 + 5}$

$= \sqrt{25}$

$= 5$

Limit laws (+.5)

(+.5)

(skipping over limit laws)

$= \sqrt{5 \lim_{x \to -1} h(x) + 5}$

$= \sqrt{5 \cdot 4 + 5}$

or $= \sqrt{25} = 5$