

TMATH 124 Quiz 2

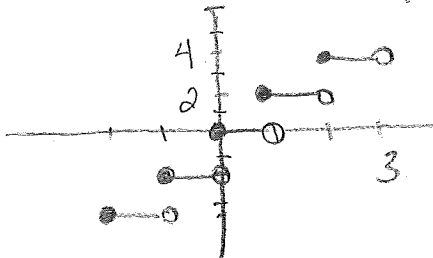
Key

Show *all* your work (numerically, algebraically, or geometrically) for each and simplify. Supporting work is needed to earn credit. There are two sides of this quiz.

1. [2] (§2.4 #114) Let $f(x) = 2\lceil x \rceil$ where $\lceil x \rceil$ is the greatest integer function. Find all x where f is not continuous. Justify your answer. (+1)

$\lceil x \rceil$ returns the largest integer that is less than or equal to x
 ex $\lceil 2.1 \rceil = 2$, $\lceil 2.7 \rceil = 2$, $\lceil -0.6 \rceil = -1$

The 2 corresponds w/ mult y by 2 so the graph is:



Note there is a jump in the graph at all the integers (whose numbers are $\dots -2, -1, 0, 1, 2, \dots$)
 The jumps mean f is not cont

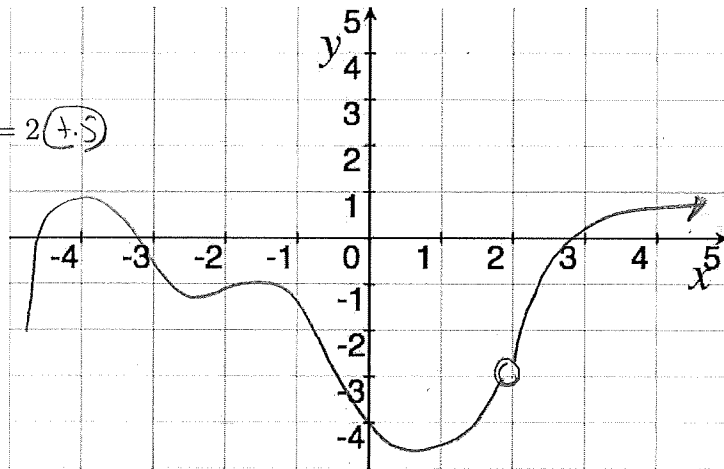
2. [3] (Continuous Activity #5) Sketch a graph of a function α that satisfies *all* of the following:

(a) $\lim_{x \rightarrow 2^-} \alpha(x) = -3$ (+1)

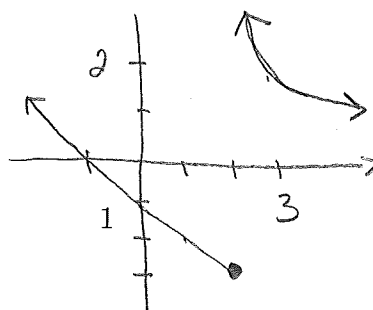
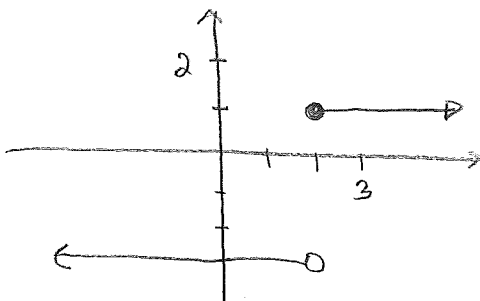
(b) is not continuous at $x = 2$ (+5)

(c) $\lim_{x \rightarrow \infty} \alpha(x) = 1$ (+1)

There are lots of correct answers



Other solutions



3. [3] (WebHW4 #10) Let $g(x) = 4x - 2$. Find $\lim_{\Delta x \rightarrow 0} \frac{g(3 + \Delta x) - g(3)}{\Delta x}$

$$\lim_{\Delta x \rightarrow 0} \frac{g(3 + \Delta x) - g(3)}{\Delta x} = \lim_{\Delta x \rightarrow 0} \frac{[4(3 + \Delta x) - 2] - [4(3) - 2]}{\Delta x}$$

$$= \lim_{\Delta x \rightarrow 0} \frac{\cancel{12} + 4\Delta x - 2 - \cancel{12} + 2}{\Delta x} = \lim_{\Delta x \rightarrow 0} \frac{4\Delta x}{\Delta x} = 4$$

alg/fractions/simplify (+1)
notation (+5)

4. [2] (WebHW5 #16) The graph to the right tracks the population of bacteria P as a function of days.

(a) Find $\lim_{x \rightarrow \infty} P(x)$.

≈ 2000 (+1)

(b) Interpret what your answer above means in terms of bacteria.

(+1) The population of bacteria will stabilize to about 2000.

