

Key

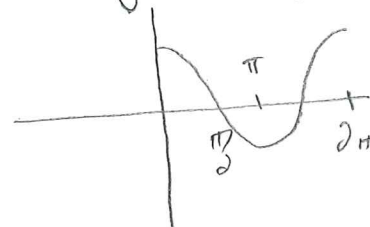
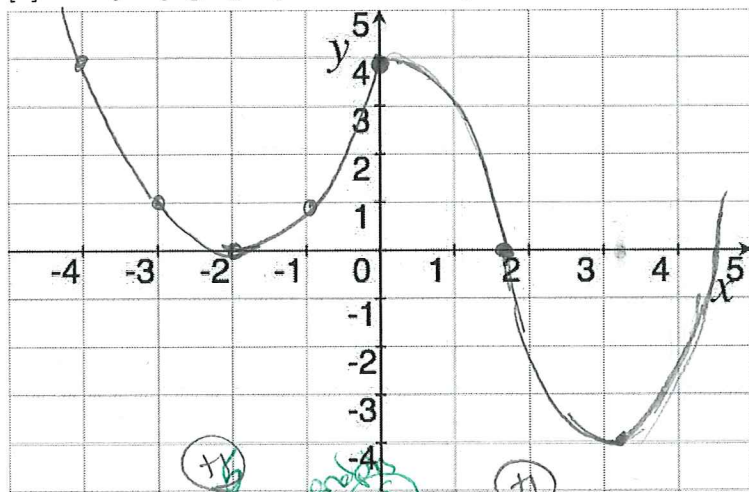
# TMATH 124 Quiz 1

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

1. (WebHW2 #5) Let  $f(x) = \begin{cases} (x+2)^2 & \text{if } x \leq 0 \\ 4 \cos(x) & \text{if } 0 < x \end{cases}$

quadratic shifted left 2  
 $\cos(x)$  "stretched" by 4 vert.  
 i.e. multiply coord by 4

(a) [2] Carefully graph  $f$  on the axis provided



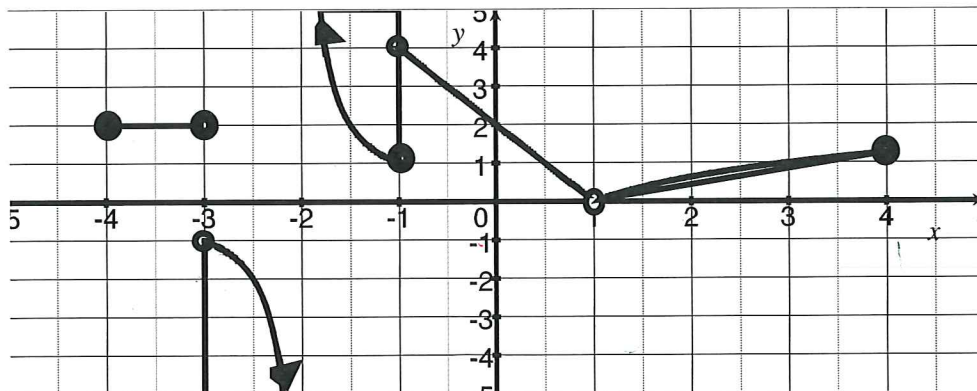
(b) [1] Determine the values of  $c$  for which  $\lim_{x \rightarrow c} f(x)$  exists.

all  $c$  :D :)

(11)

+1.5  
 partial under stud  
 need to worry about  
 2 sided limits

2. [2] (§2.2 #26) For the function  $f$  whose graph is given, estimate the value of each quantity, if it exists.



$\lim_{x \rightarrow 1} f(x)$

0  
 (11)

$\lim_{x \rightarrow -3^+} f(x)$

-1  
 (11)

approach -3 from above

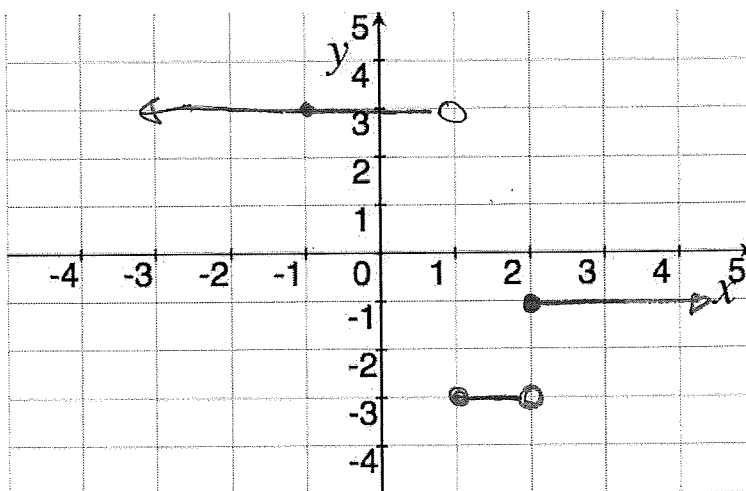
3. [3] (Limit Activity #3) Sketch a graph of a function  $\alpha$  that satisfies *all* of the following:

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

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

(+1.5) (c)  $\alpha(2) = -1$

(+1.5) function



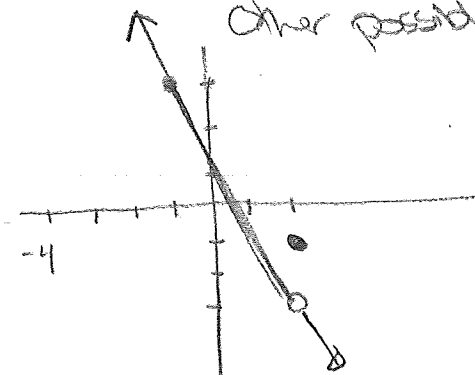
Note: There are MANY correct answers for this!

4. [2] (Quiz1 Winter2016) Write the algebraic rule for the function  $\alpha$  you created in problem 3.

$$\alpha(x) = \begin{cases} 3 & \text{if } x < 1 \\ -3 & \text{if } 1 \leq x < 2 \\ -1 & \text{if } 2 \leq x \end{cases}$$

Other possible answers that are fun

line: slope  $\frac{-6}{3} = -2$



$$\alpha(x) = \begin{cases} -2x + 1 & \text{if } x \neq 2 \\ -1 & \text{else} \end{cases}$$