

NAME:

1. [5] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true. Otherwise, circle F. Let  $f$  be a function, and  $x$ ,  $y$ , and  $z$  be real numbers.

T F  $\frac{1}{x+2} + \frac{1}{x} = \frac{1}{x+2} + \frac{1+2}{x+2} = \frac{4}{x+2}$

T F  $(x+2)^2 = x^2 + 4$

T F  $f(x+2) = f(x) + 2$

T F A eighth degree polynomial will have eight complex roots.

T F  $\frac{3+5i}{1-2i} = -\frac{7}{5} + \frac{11}{5}i$

Show your work for the following problems. The correct answer with no supporting work will receive NO credit.

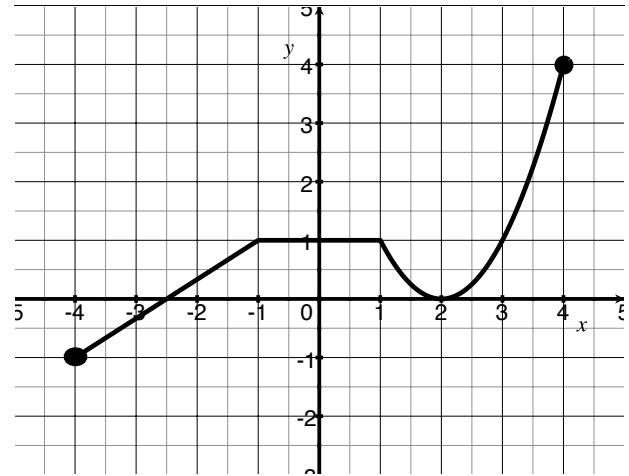
2. (Practice exam #3) [4] Find any real or imaginary  $x$  such that  $\frac{1}{x+1} + \frac{1}{2} = \frac{1}{x+3}$

3. Let  $g$  be the function comprised of two lines and a parabola that has only been shifted (not vertically stretched):

(a) (Quiz1 #3d) [2]  
Find the range of  $g$ .

(b) (§1.1 #48) [1]  
Find the  $y$  intercept(s).

(c) (Inverse Wks #2) [2]  
Does  $g$  have an inverse?  
Why or why not?



(d) (S1.3 #56 & ) [6] Estimate the following *if* possible:

$$\frac{2g(2) + 1}{g(-1)}$$

$$(g \circ g)(-4)$$

(e) [4] (WebHW1 #21 & WebHW2 #5 & WebHW3 #12) Find the piece-wise defined rule of  $g$  in the indicated form.

$$g(x) = \begin{cases} & \text{if } -4 \leq x < -1 \\ & \text{if } -1 \leq x < 1 \\ & \text{if } 1 \leq x < 4 \end{cases}$$

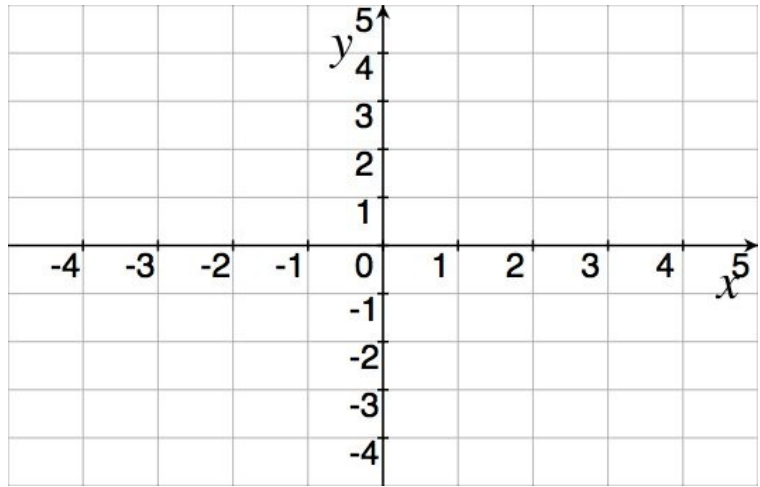
4. Let  $f$  be the *function* defined by

$$f(x) = \begin{cases} \frac{1}{x} - 2 & x \leq 1 \\ -x + 3 & 1 < x \end{cases}$$

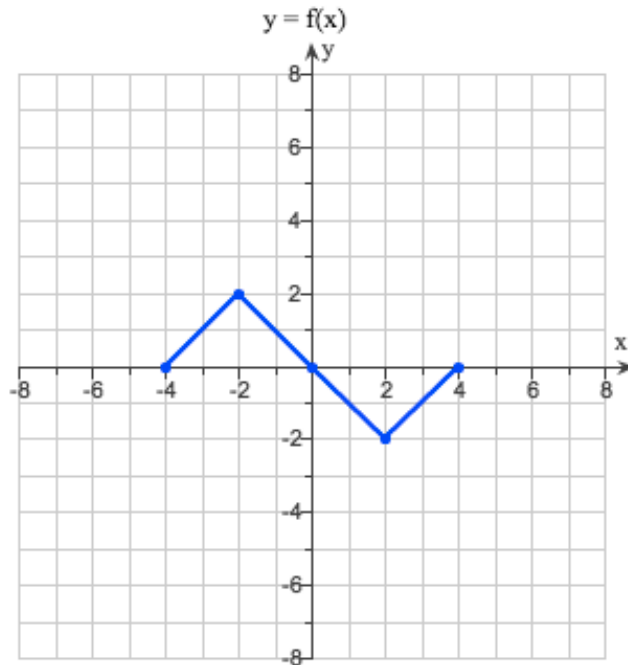
(a) [3] (Line Wks #6 & WebHW1 #21) Graph  $f$ .

(b) [2] Is  $f$  a function? Why or why not?

(c) [2] (Quiz1 #3b) Find all possible input(s) so that  $f(x) = -1$ .



5. [3] (Quiz2 #2) Given the piece-wise defined function  $f$  shown below. Graph  $g(x) = -2f(x - 1)$ .



6. Let  $\alpha(x) = \sqrt{3x - 7}$  and  $\beta(x) = \frac{x-1}{x}$ .

(a) [2] (§1.6 #39) What is the domain of  $\alpha$ ?

(b) [4] (Quiz2 # 3b)  
What is the rule of  $\beta \circ \alpha$ ?

(WebHW3 #24)  
What is the domain of  $\beta \circ \alpha$ ?

(c) [3] (§1.7 #56) Given that  $\beta$  has an inverse, find  $\beta^{-1}$ .

(d) (Inverse Wks) [2] What is the range of  $\beta$ ? Justify yourself.

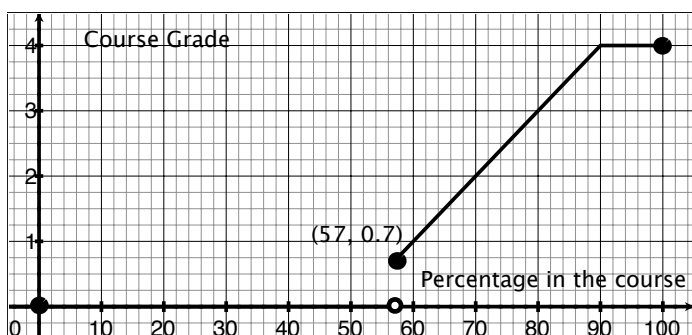
7. [5] Choose *ONE* of the following. Clearly identify which of the two you are answering and what work you want to be considered for credit.

No, doing both questions will not earn you extra credit.

- (a) (Word Problems #9) Leonard McCoy is in this course and during the seventh week he logged into MyMathLab and computed the average of his WebHW's, WrittenHW's, Quizzes, and Exams. The numbers are reported below.

McCoy's work did not change drastically in the remaining 3 weeks of the course and ultimately he earned a 3.0 in the course. What grade did he earn on the final exam to earn a 3.0 for the course? In case you don't remember, the weights specified in the syllabus and the graph of the function  $f$  that takes your class percentage  $x$  and returns your score on a 4. scale are also provided.

	weight	McCoy's ave
Mini-Quizzes	5%	95%
WebAssign	10%	100%
WrittenHW	15%	95%
Quizzes	15%	65%
2 Exams	30%	70%
Final	25%	?



- (b) (Practice Exam #12) A manufacturer of soft drinks advertises their orange soda as “naturally flavored”, although it contains only 6% orange juice. A new federal regulation stipulates that to be called “natural” a drink must contain at least 15% fruit juice. The manufacturer mixes their juices in closed 900 gallon containers (to avoid contamination). How much juice must they remove from the 900 gallon container and replace with pure orange juice to conform to the new regulation?