

# Quiz 1

Key

Show *all* your work. No credit is given without reasonable supporting work. There are *two* sides to this quiz.

1. [2] Let  $a$  and  $b$  be non-zero numbers. Add and then simplify:

common denominator (+.5)  
 fancy 1 (+.5)  
 algorithm (+.5)  
 alg (+.5)

$$\frac{b}{a} + \frac{2b}{\frac{1}{b}b} = \frac{b}{a} + \frac{2b}{\frac{1}{b} \cdot b} = \frac{b}{a} + \frac{2b}{1}$$

$$= \frac{b}{a} + \frac{2ba}{1a} = \frac{b + 2ba}{a}$$

2. Let  $f(x) = \frac{x+4}{x^2-9}$ .

- (a) [1] (§1.3 #32) Find  $f(0)$ .

$$f(0) = \frac{0+4}{0^2-9} = \frac{4}{-9} = \frac{-4}{9}$$

- (b) [2] (WebHW1 #5) Find  $f(2+k)$ .

$$f(2+k) = \frac{(2+k)+4}{(2+k)^2-9} = \frac{k+6}{(2+k)^2-9}$$

or  $\frac{k+6}{4+4k+k^2-9} = \frac{k+6}{k^2+4k-5}$

or squaring the sum (alg) (+.5)

- (c) [1] (WebHW1 #9) Use the domain convention to find the domain of  $f$ .

need to make sure  $f$  returns real numbers...

(+.5) { want the denominator  $\neq 0$

$$x^2 - 9 \neq 0$$

$$(x+3)(x-3) \neq 0$$

$$\Rightarrow x+3 \neq 0 \text{ and } x-3 \neq 0$$

$$\Rightarrow x \neq -3 \text{ and } x \neq 3$$

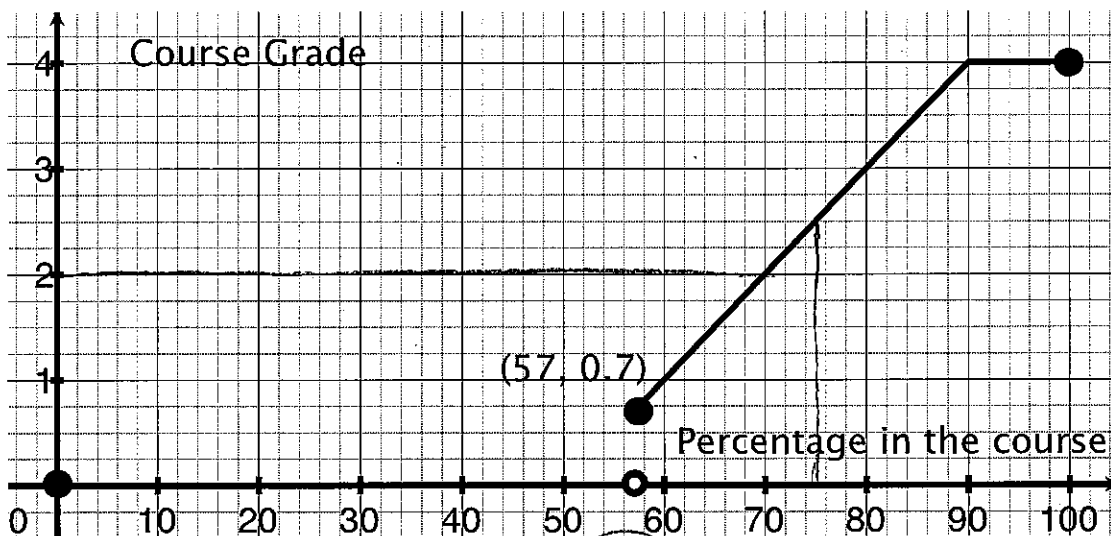
or  $x$  can be any real number but  $-3$  or  $3$

or

$$(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$$

alg (+.5)

3. Let  $f$  be the piecewise defined graph shown below that takes as inputs your percentage in the course and returns your grade on a 4. scale:



(a) [1] (§1.3 #14) Is  $f$  a function? Why or why not?

yes - each input (percentage in the course) corresponds to at most one output (course grade)  
 or it passes the vertical line test

(b) [1] (§1.1 #30) Is the point  $(3, 80)$  on the graph of  $f$ ?

no if  $x=3$  then  $f(3)=0$

(c) [1] (§1.3 #56) Estimate  $f(75)$ .

$\approx 2.5$

(so  $x=75$   
 what is corresponding  $y$  value)

(d) [1] Estimate the course percentage needed to earn a 2.0 in the class.

$\approx 70$

(so  $y=2.0$   
 what is corresponding  $x$  value)