Quiz 2E

Key

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

1. [2] (Worksheets 10/3 #6 & 10/5 #4) Let f be the piecewise defined function:

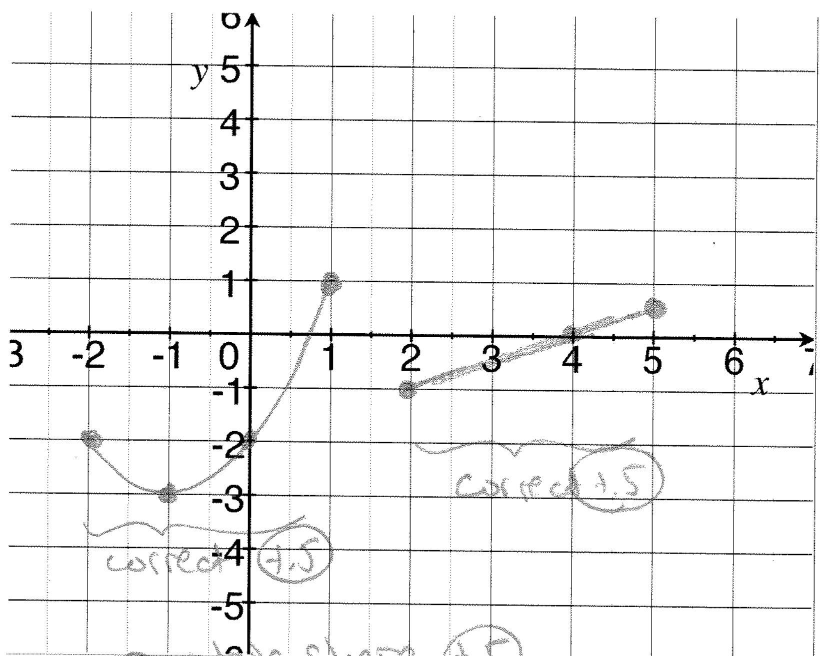
$$f(x) = \begin{cases} (x+1)^2 - 3 & \text{if } -2 \le x \le 1 \\ \frac{1}{2}x - 2 & \text{if } 2 \le x \le 5 \end{cases}$$

parabola shifted down 3 & left 1
line slope of 1/2 & y-intercept of -2

Graph f

Partial +1

x	f(x)
-2	$(-2+1)^2-3=-2$
-1	$(-1+1)^2-3=-3$
0	$(0+1)^2-3=-2$
1	$(1+1)^2-3=1$
2	$\frac{1}{2}(2)-2=-1$
3	$\frac{1}{2}(3)-2=-.5$
4	$\frac{1}{2}(4)-2=0$



parabola shape +.5
line shape +.5

2. (§2.7 #47) [2] Find f and g so that $(f \circ g)(x) = \dfrac{x^2}{x^2+4}$ (and neither f nor g is equal to the $y = x$ function).

There are lots of answers!

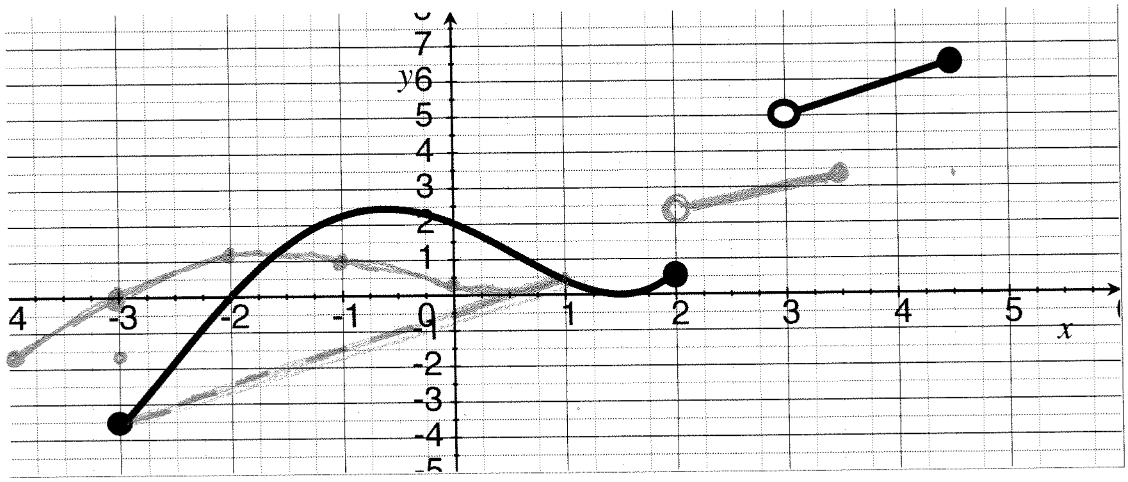
correct/work +1

$f(x) = \dfrac{x}{x+4}$ works b/c $(f \circ g)(x) = f(g(x)) = f(\boxed{x^2})$

$g(x) = x^2$ $= \dfrac{\boxed{x^2}}{\boxed{x^2}+4}$

comp +.5
id parts +.5

3. Use the the graph of C shown below to answer the following questions:



(a) (WebHW3 #9) [1] Estimate $(C \circ C)(0)$.

$(C \circ C)(0) = C(C(0)) = C(2) = .5$ (+.5) (+.5)

(b) (WebHW4 #9) [1] Estimate the average rate of change between -3 and 1.

$(-3, -3.5)$ and $(1, .5)$

$\frac{\Delta y}{\Delta x} = \frac{-3.5 - .5}{-3 - 1} = \frac{-4}{-4} = 1$

ie slope of the above line (dotted

knew (+.5)
got it (+.5)

$\frac{1}{2}C(-1+1) = \frac{1}{2}C(0) = \frac{1}{2}(2) = 1$

(c) (§2.4#19f)[2] Sketch the graph of $\frac{1}{2}C(x+1)$.

vert shrink by 2 / stretch by ½ (+.5)
horiz shift left by 1 (+.5)
(+.5) implementation

4. (§2.7 #29) Let $f(x) = 2x + 3$ and $g(x) = 4x - 1$

(a) [1] Find $f \circ g$ and its domain.

1

$(f \circ g)(x) = f(g(x)) = f(4x-1) = 2(4x-1) + 3 = 8x - 2 + 3 = 8x + 1$

(+.5) good

Domain: all reals (+.5)

(b) [1] Find $\frac{f}{g}$ and its domain.

$\left(\frac{f}{g}\right)(x) = \frac{2x+3}{4x-1}$ (+.5)

Domain: all # so that den $\neq 0$

ie all x so $4x - 1 \neq 0$

$\Rightarrow 4x \neq 1$

$\Rightarrow x \neq 1/4$ (+.5)

or $(-\infty, 1/4) \cup (1/4, \infty)$