

Key

# Quiz 2

Name(s):

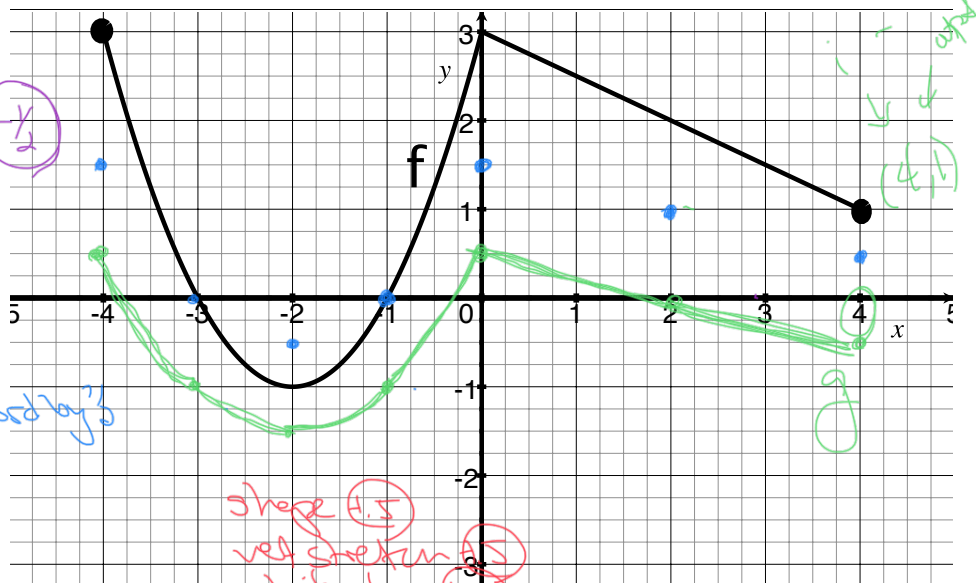
Show *all* your work. Reasonable supporting work must be shown for any partial credit.

1. For this quiz, let  $f$  be the function graphed below and  $g(x) = \frac{1}{2}f(x) - 1$

(a) [1] Estimate  $g(4)$ .

$$g(4) = \frac{1}{2}f(4) - 1 = \frac{1}{2}(1) - 1 = -\frac{1}{2}$$

(b) [3] Write the graph transformations to transform  $f$  into  $g$  and then sketch a graph of  $g$ .



(c) [1] Find  $(f + g)(4)$

$$(f+g)(4) = f(4) + g(4) = 1 + -\frac{1}{2} = \frac{1}{2}$$

(d) [2] Find  $(g \circ f)(-3)$

$$g(f(-3)) = g(0) = \frac{1}{2}f(0) - 1 = \frac{1}{2}(3) - 1 = \frac{3}{2} - 1 = \frac{1}{2}$$

(e) [3] Find the piece-wise defined algebraic rule for the function  $f$  of the form:

$$f(x) = \begin{cases} (x+2)^2 - 1 & -4 \leq x \leq 0 \\ -\frac{1}{2}x + 3 & 0 < x \leq 4 \end{cases}$$

parabola  
looks like  $y = a(x-h)^2 + k$   
vertex @  $(-2, -1)$   
 $\Rightarrow y = a(x+2)^2 - 1$   
 $\Rightarrow y = a(x+2)^2 - 1$   
thru  $(-1, 0)$  so  
 $0 = a(-1+2)^2 - 1$   
 $1 = a(1) \Rightarrow a = 1$

line  
looks like  $y = mx + b$   
 $m = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{3-1}{0-4} = \frac{2}{-4} = -\frac{1}{2}$   
thru  $(0, 3)$  and  $(4, 1)$   
So  $y = -\frac{1}{2}x + b$   
 $b = 3$  (y-intercept)