

Fall '10

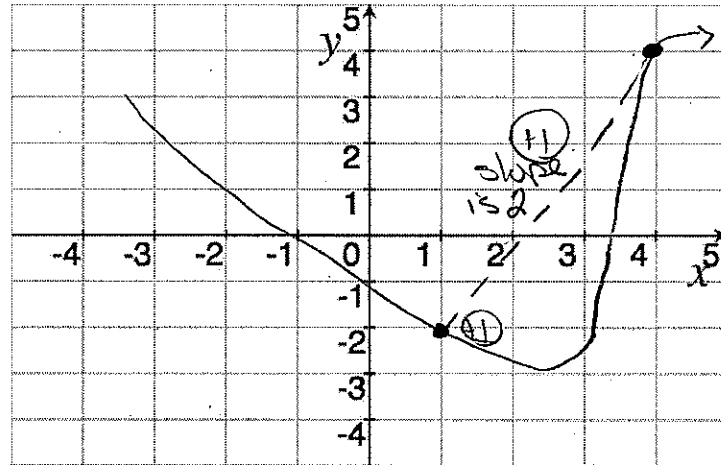
Quiz 2

Key

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

1. [3] (§2.7 #1 & 14) Draw a function α that satisfies the following criteria:

- (a) $\alpha(1) = -2$
- (b) α is decreasing on the interval $[-3, 2]$
- (c) the average rate of change between $x = 1$ and $x = 4$ is 2



(+1)

2. [2] (Line Wks #6) Let the graph of the function β be a line with slope $\frac{1}{3}$ and assume it passes through the point $(3, 4)$. Find the rule of β .

$$y = mx + b$$

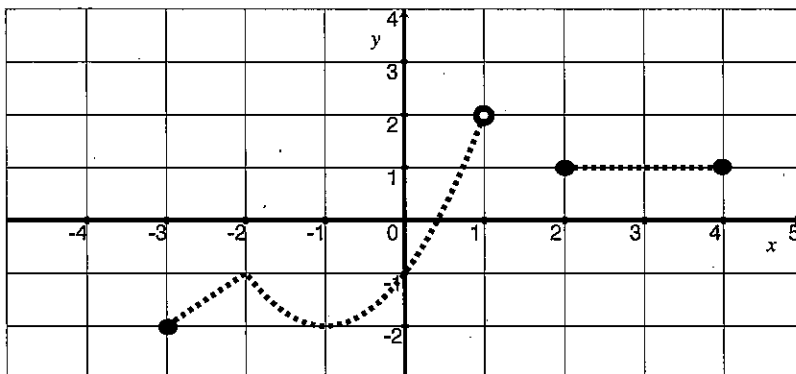
$$y = \frac{1}{3}x + b$$

b/c passes through $(3, 4)$ we know $-\frac{1}{3}(3) + b = 4$

$$-1 + b = 4$$
$$b = 5$$

so $y = \frac{1}{3}x + 5$

3. Consider the following piece-wise defined graph of g .



(a) [1] (§2.7 #20b) Evaluate $(g \circ g)(0)$.

$$(g \circ g)(0) = g(g(0)) = g(-1) = -2$$

(b) [4] (§2.4 #11 & §1.10 #14) The function g is comprised of two lines and a parabola. The parabola has been shifted both vertically and horizontally (but not stretched vertically in anyway). Use your knowledge of lines and graph transformations to find a formula for g in the indicated form:

$$g(x) = \begin{cases} x+1 & \text{if } -3 \leq x < -2 \\ (x+1)^2 - 2 & \text{if } -2 \leq x < 1 \\ 1 & \text{if } 2 \leq x \leq 4 \end{cases}$$

$-3 \leq x < -2$ line (+.5)
 line through $(-3, -2)$ & $(-2, -1)$
 slope = $\frac{-1+2}{-2+3} = \frac{1}{1} = 1$ (+.5)
 passes through $(-2, -1)$ so:
 $-1 = 1(-2) + b$
 $-1 + 2 = b$ (+.5) norm
 $1 = b$ (+.5)
 so $y = 1x + 1$ (+.5)

$-2 \leq x < 1$ quad (+.5)
 vert shift down by 2 (+.5)
 $x^2 - 2$
 horiz shift left by 1 (+.5)
 $(x+1)^2 - 2$ (+.5)
 vert or horiz shift (+.5)

$2 \leq x \leq 4$
 horiz line
 at $y = 1$
 (+1)