

Quiz 3

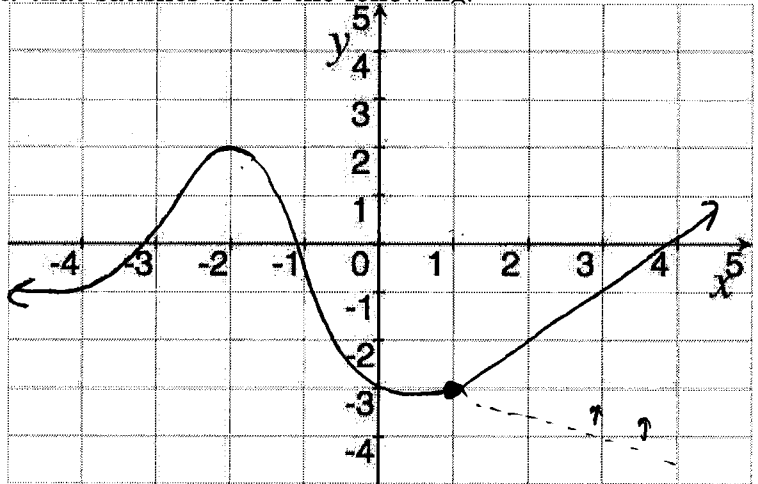
Key

This is a two-stage quiz. During the first stage, use your knowledge & calculator to take this quiz. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have 15 min. to write one solution (with everyone's name on it!!!) to be turned in for the group.

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

1. [4] Sketch the graph of a function α that satisfies *all* of the following.

- (a) $\alpha(1) = -3$ (+.5)
 (b) α is continuous on $(-3, 3)$ (+.5)
 (c) $\alpha'(-2) = 0$ (x)
 (d) $\alpha'(x) > \frac{-1}{2}$ when $1 < x < 3$ (+.5)



White HW
 3/4/3 = 40

Activity MVT #1

2. [1] Consider α described above. What is the ~~largest~~ ^{smallest} value $\alpha(3)$ could be?

The graph must stay above the dashed line

reasoning (+) $\Rightarrow \alpha(3)$ has to be above -4

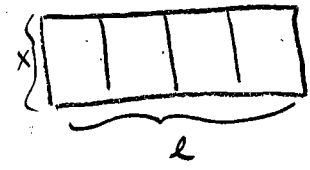
OR $\frac{\alpha(3) - \alpha(1)}{3 - 1} = f'(c)$ for $1 \leq c \leq 3$
 $\frac{\alpha(3) + 3}{2} > -\frac{1}{2} \Rightarrow \alpha(3) + 3 > -1$
 $\Rightarrow \alpha(3) > -4$

3. Consider the following problem: a farmer with 650 feet of fencing wants to enclose a rectangular area and then divide it into four pens with fencing parallel to one side of the rectangle.

- (a) [3] Find a function that describes total area of the four pens as a function of only one variable.

Area = $x \cdot l$
 (note: 2 variables)

(+.5) $650 = x + x + x + x + l + l$
 $650 = 5x + 2l$
 $\Rightarrow l = \frac{1}{2}(650 - 5x)$ (+.5)



White HW/3

Area = $x \left(\frac{1}{2}(650 - 5x) \right)$ sub

look for extreme (+.5)
 notation (+.5)
 verify max (+.5)
 get x or l (+.5)

- (b) [2] Find the greatest area of the four pens.

We need to maximize

Desmos: (65, 10,562.5)

OR $Area = \frac{x}{2}(650 - 5x) = 325x - \frac{5}{2}x^2$
 Method B
 $Area'(x) = 325 - 5x$
 $Area'(x) = 0$ when $x = \frac{325}{5} = 65$
 $\Rightarrow Area = 10,562.5 ft^2$