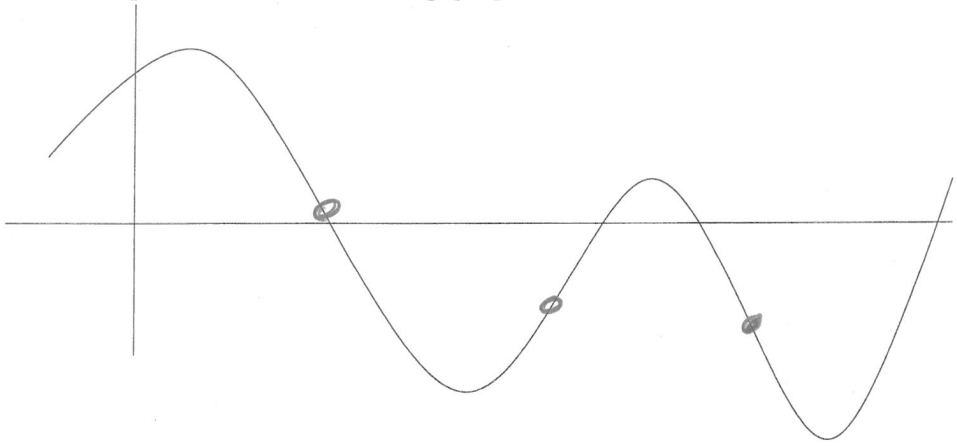
Mathematics 122

Quiz # 17 Name: Key

You must show your work to get full credit.

1. Label the inflection points on the following graph.



2. Find the inflection point (give both x and y values) on the graph of

$$y = 2x^3 - 6x^2 + 4x - 1$$

$y = f(x)$

$y' = 6x^2 - 12x + 4$

$y'' = f''(x) = 12x - 12$

To find inflection point set $f''(x) = 12x - 12 = 0$

to get $x = 1$, $y = f(1) = 2 - 6 + 4 - 1 = -1$

Inflection point is $(1, -1)$

3. A variety of tomato will produce 8 lbs of tomatoes if raised in a open field. But we have a small garden such that each plant in the garden reduces the yield of all plants by 2 lbs/plant. (This even with just one plant in the garden the production of the plant will be $8 - 2 = 6$ lbs.)

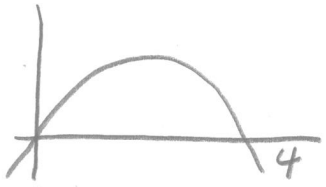
(a) What is the total yield, y, of tomatoes if x tomato plants are planted.

$y = (\#\text{ of tomatoes})(\text{Yeald/tomato})$

$= x(8 - 2x)$

$y = x(8-2x)$

(b) How many plants should be planted to maximize the yield?



$y = x(8-2x)$

$= 2x(4-x)$

From picture (and that this is a parabola) we see maximizer is $x = 2$

Maximizing number of plants 2

or $y = 8x - 2x^2$

$y' = 8 - 4x$

Critical: solve $y' = 8 - 4x = 0$

$x = 2$ (+ + + | − − − y')

so $x = 2$ is max