

Math 157 - Quiz 9

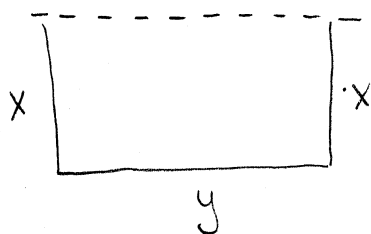
November 5, 2014

Name key

Score

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Page 193, Problem #36



MAXIMIZE AREA = $A = xy$

s.t. $2x + y = 100$

$y = 100 - 2x$

$$A(x) = x(100 - 2x) = 100x - 2x^2$$

$$A'(x) = 100 - 4x = 0 \Rightarrow x = 25$$

Signs of $A'(x)$ $\leftarrow + \quad - \rightarrow$
25

$A(25)$ IS A MAX!

$$A(25) = 1250$$

DIMENSIONS ARE 25 FT x 50 FT.

MAX AREA IS 1250 FT²

2. (3 points) Page 199, Problem #2

$$P(q) = 500q - q^2 - 150 - 10q$$

$$P(q) = 490q - q^2 - 150$$

$$P'(q) = 490 - 2q = 0$$

$$\Rightarrow q = 245$$

Signs of $P'(q)$ $\leftarrow + \quad - \rightarrow$
245

$q = 245$ gives A
MAX.

$q = 245$ gives A MAX

$$P(245) = 59,875$$

DEMAND IS LINEAR.

$$\text{Point: } (p, q) = (4, 4000)$$

$$\text{Slope: } m = \frac{\Delta q}{\Delta p} = \frac{200}{-0.25} = -800$$

$$q - 4000 = -800(p - 4)$$

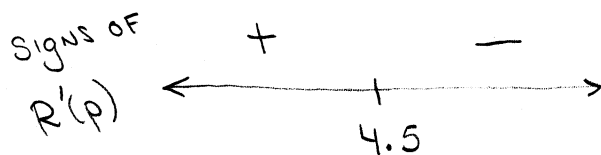
$$q = 4000 - 800(p - 4)$$

$$q = -800p + 7200$$

$$R(p) = p(-800p + 7200) = -800p^2 + 7200p$$

$$R'(p) = -1600p + 7200 = 0$$

$$\Rightarrow p = 4.5$$



$p = 4.5$ MAXIMIZES
REVENUE

MAX REVENUE WHEN

$$p = \$4.50$$

$$q = -800(4.5) + 7200 = 3600$$