

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 10

Question 1. (10 marks) If exactly 200 people sign up for a charter flight, Leisure World Travel Agency charges \$300/person. However, if 200 or more people sign up for the flight (assume this is the case), then each fare is reduced by \$1 for each additional person over 200. Determine how many passengers will result in a maximum revenue for the travel agency. What is the maximum revenue? What would be the fare per passenger in this case? (Use the four step process outlined in class to solve this problem. Make sure to state any restrictions that you find.)

LET x BE THE NUMBER OF PEOPLE OVER 200.

$$1) \therefore \# \text{ OF PEOPLE} = 200 + x, \quad \text{PRICE PER PERSON} = 300 - x$$

$$\therefore R(x) = (200 + x)(300 - x)$$

$$2) R(x) = 60000 + 100x - x^2$$

RESTRICTIONS: $x \geq 0$ (MORE THAN 200 PEOPLE)

$x \leq 300$ (NON-NEGATIVE PRICE)

\therefore DOMAIN OF $R(x)$ IS $[0, 300]$

$$4) R'(x) = 100 - 2x = 0$$

$$100 = 2x$$

$$\Rightarrow 50 = x$$

C.N.

$$\begin{aligned} R(50) &= 60000 + 100(50) - (50)^2 \\ &= 60000 + 50000 - 2500 \\ &= 62500 \leftarrow \text{MAXIMUM.} \end{aligned}$$

END POINTS

$$R(0) = 200 \cdot 300 = 60000$$

$$R(300) = 0$$

THE MAXIMUM REVENUE IS \$62500.

THE FARE PER PASSENGER IS $300 - 50 = \$250$.