

1) A company sells leaf blowers and a special 10 ft. attachment to the leaf blower to clean gutters. Let x and y be the number of leaf blowers sold per month and the number of attachments sold per month, respectively. Suppose that $p = 1200 - 8x - y$ is the price in dollars for a leaf blower and $q = 523 - 1.5x - 0.15y$ is the price in dollars for the 10ft. attachment

- a) Determine the revenue function $R(x,y)$
- b) Determine $R_x(x,y)$ and $R_y(x,y)$ and interpret each
- c) Evaluate and Interpret $R_x(50,25)$

2) Tube Town, a recently opened water park, spends x thousand dollars on radio advertising and y thousand dollars on T.V. advertising. The park has weekly ticket sales in tens of thousands of dollars of : $TS(x,y) = 1.5x^2 + 3.2y^2$

- a) Determine $TS_x(x,y)$ and $TS_y(x,y)$
- b) Determine $TS_x(1, 0.5)$ and $TS_y(1, 0.5)$ and interpret each.

3) The Ridit Bike Company manufactures 21 speed racing bikes and 21 speed mountain bikes. Let x represent the weekly demand for racing bikes and y represent the weekly demand for mountain bikes. Then the price-demand equations are as follows: $p = 350 - 4x + y$ and $q = 450 + 2x - 3y$ where p is the price for the racing bike and q the price for the mountain bike.

- a) Determine the Revenue function $R(x,y)$
- b) Determine $R_x(x,y)$ and $R_y(x,y)$
- c) Evaluate and Interpret $R(15,20)$ and $R_x(15,20)$ and interpret

Answers:

1) a. $R(x, y) = 1200x - 8x^2 - 2.5xy + 523y - 0.15y^2$ b. $R_x(x, y) = 1200 - 16x - 2.5y$ gives the amount that each additional leaf blower adds to the total revenue. $R_y(x, y) = -2.5x + 523 - 0.3y$ gives the amount that each additional attachment adds to the total revenue. c. $R_x(50, 25) = 337.5$ this means that when 50 leaf blowers and 25 of the attachments have been sold, the company receives \$337.50 for each *additional* leaf blower sold.

2) a. $TS_x = 3x$ and $TS_y = 6.4y$ b. $TS_x(1, 0.5) = 3$ and $TS_y(1, 0.5) = 3.2$ if \$1000 is spent each week on radio ads and \$500 spent each week on TV ads, when the TV ads are held fixed at \$500 then the sales will be increasing at a weekly rate of \$30,000 per each additional \$1000 spent on radio ads. Also if \$1000 is spent each week on radio ads and \$500 spent each week on TV ads, when the Radio ads are held fixed at \$1000 then the sales will be increasing at a weekly rate of \$32,000 per each additional \$1000 spent on TV ads.

3) a. $R(x, y) = 350x - 4x^2 + 3xy + 450y - 3y^2$ b. $R_x = 350 - 8x + 3y$ and $R_y = 3x + 450 - 6y$
c. $R(15, 20) = 13,050$ when the weekly demand is 15 racing bikes and 20 mountain bikes the revenue is \$13,050. $R_x(15, 20) = 290$ When the weekly demand is 15 racing bikes and 20 mountain bikes, and the demand for mountain bikes is held fixed, the revenue will increase \$290/racing bike sold.