

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 Redit 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.