Implicit Differentiation:

1) Suppose the VeeCam Company determines that the price-demand equation for their economy tripod is given by: \( p + 2xp + x^2 = 125 \) where \( x \) represents the demand for tripods in thousands and \( p \) represents the price in dollars. Determine \( \frac{dp}{dx} \). Evaluate and interpret \( dp/dx \) at \( (2.5, 19.5) \).

Related Rates:

2) Past records of the TechTop Company determine that the revenue for the number of software suites produced and sold is given by: \( R = 90x - x^2 \), where \( x \) is the units produced and sold and \( R \) is the revenue in dollars. The company also finds that the software is selling at a rate of 5 suites per day. How fast is the revenue changing when 40 suites are being produced and sold?

3) The SoftSkirt Company determines that the monthly revenue for a new style skirt is given by: \( R = 60 - \frac{1}{2}x^2 \), where \( x \) is the number of skirts produced and sold in hundreds, and \( R \) is the revenue in thousands of dollars. Determine the rate of change in the revenue with respect to time at a production level of \( x = 3 \) and production increasing by 20 hundred skirts per month.

4) When the price of a certain commodity is \( p \) dollars per unit, the manufacturer is willing to supply \( x \) thousand units where, \( x^2 - 2x\sqrt{p - p^2} = 31 \) How fast is the supply changing when the price is $9 per unit and is increasing at the rate of 20 cents per week?

5) When the price of a certain commodity is \( p \) dollars per unit, consumers demand \( x \) hundred units where \( 75x^2 + 17p^2 = 5300 \). How fast is the demand changing with respect to time when the price is $7 and is decreasing at a rate of 75 cents per month.
Answers:

1) \( \frac{dp}{dx} = \frac{-2x - 2p}{1 + 2x} \), when the demand is 2.5 thousand tripods and the price is $19.50, the price is decreasing at a rate of $7.33 per thousand tripods

2) Revenue is increasing at a rate of $50/day, when 40 suites are produced and sold.

3) When 300 skirts are sold and increasing by 2000/month, the revenue is decreasing at a rate of $60,000/month,

4) The supply is increasing at a rate of 206 units/week (you must use x = 14)

5) The demand is increasing approx 15 units/month (use dp/dt = -0.75)