

Math 251: Pledged Set 6

Due: October 15, 2009

This is a pledged set. Therefore, no outside help from book, calculator, or other people.

1. Show by implicit differentiation that the tangent to the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

at the point (x_0, y_0) is

$$\frac{x_0x}{a^2} + \frac{y_0y}{b^2} = 1$$

2. Use logarithmic differentiation to find the derivative of

$$y = x^{\cos(x)}.$$

3. If a ball is given a push so that it has an initial velocity of 5m/s down a certain inclined plane, then the distance it has rolled after t seconds is $s = 5t + 3t^2$.
 - (a) Find the velocity after 2 s.
 - (b) How long does it take for the velocity to reach 35 m/s?
4. A curve passes through the point $(1, 5)$ and has the property that the slope of the curve at every point P is twice the x -coordinate of P . What is the equation of the curve?
5. Each side of a square is increasing at a rate of 6cm/s. At what rate is the area of the square increasing when the area of the square is 16cm²?