1. Find \( \frac{dy}{dx} \) by implicit differentiation:
   
   (a) \( x^3 - 2y^4 = 6xy \)
   
   (b) \( y = \sin(x + y) \)

2. A simple (mythical) mathematical model of the spread of a destructive pest is that of a circle, encompassing the pest, whose radius, \( r \), increases at the rate of 10 miles per year. How fast is the area of the infected region increasing when the radius has reached 25 miles from the point of origin?
3. A balloon is launched vertically during Morgantown’s balloon festival. It is being tracked from a distance of one thousand yards from the launch point by an instrument that measures the rate of change of the angle from the horizontal, $\theta$, as it follows the balloon. If $\frac{d\theta}{dt} = .005$ radians/sec as it passes through $\pi/4$ radians, what is the vertical velocity of the balloon when the angle is $\pi/4$ radians? What is its height at that time?

4. Use the linear approximation $L(x)$ to an appropriate function $f(x)$ to find an approximate value to $(17)^{1/4}$. 