

1. Find the derivative of the following:

(a) $y = x^x$

(b) $y = \ln \left(\frac{x^2 - 4}{2x + 5} \right)$

(c) $y^x = x^y$

(d) $f(x) = \sinh^3 x$

(e) $f(x) = \ln(\sinh x)$

(f) $y = (\sin x)^x$

2. The radius of a sphere is found to be 21 *cm* with a possible error in measurement of at most .05 *cm*. What is the maximum error in using this value of the radius to compute the volume of the sphere? (**HINT:** use differentials)
3. A baseball diamond is a square with each side being 90 feet. A batter hits the ball and runs toward first base with a speed of 24 ft/s. At what rate is his distance from second base decreasing when he is halfway to first base?
4. **Show** that $\cosh x + \sinh x = e^x$
5. The altitude of a triangle is increasing at a rate of 1 cm/min while the area of the triangle is increasing at a rate of 2 cm²/min. At what rate is the base of the triangle changing when the altitude is 10 cm and the area is 100 cm²?