

Worksheet # 22: Linear Approximation

- For each of the following, use a linear approximation to estimate the actual value.
 - $\tan(44^\circ)$
 - $(3.01)^3$
 - $\sqrt{17}$
 - $8.06^{2/3}$
- Suppose we want to paint a sphere of radius 200 cm with a coat of paint .2 cm thick. Use a linearization to approximate the amount of paint we need to do the job.
- (MA 113 Exam III, Problem 4, Spring 2009). Let $f(x) = \sqrt{16+x}$. First, find the linear approximation to $f(x)$ at $x = 0$. Then use the linear approximation to estimate $\sqrt{15.75}$. Present your solution as a rational number (fraction).
- Your physics professor tells you that you can replace $\sin \theta$ with θ in equations when θ is close to zero. Explain why this is reasonable.
- Suppose we measure the radius of a sphere as 10 cm with an accuracy of $\pm .5$ cm. Use a linear approximation to estimate the maximum error in (a) the computed surface area and (b) the computed volume.