3.6 Derivatives of Logarithmic Functions

Fact: $\frac{d}{dx}(a^x) = a^x \ln a$ $\qquad\qquad$ $\frac{d}{dx}(\log_a x) = \frac{1}{x \ln a}$

Fact: $\frac{d}{dx}(\ln x) = \frac{1}{x}$ **Proof:**

Ex3.5) 1. $y = \ln(\sin^2 x)$

2. $y = \frac{1}{\ln x}$

3. $y = \frac{u}{1 + \ln u}$

4. Find the equation of the tangent line to $y = x^2 \ln x$ at the point (1, 0).

3.9 Related Rates

Steps for Success with Related Rates:

Step #1: Read, reread, re-reread.

Step #2: If possible, draw a picture.

Step #3: Find a “known” formula.

Step #4: Take a derivative of everything (changing) **with respect to time.**

Step #5: Substitute “given” values.

Step #6: Solve for the unknown.

See problems (and solutions) on course website.