To be prepared for Test 3, you should be able to:

- Find the derivatives of the six basic trig. Functions
- Know \( \lim_{\theta \to 0} \frac{\sin \theta}{\theta} \) and \( \lim_{\theta \to 0} \frac{\cos \theta - 1}{\theta} \)
- Take derivatives using the Chain Rule (algebraically, numerically, and graphically) in combination with all of the other derivative rules you know.
- Find \( \frac{d}{dx} a^x \)
- Do Implicit Differentiation
- Find \( \frac{d}{dx} \sin^{-1} x, \frac{d}{dx} \cos^{-1} x, \frac{d}{dx} \tan^{-1} x \)
- Find \( \frac{d}{dx} \log_a x, \frac{d}{dx} \ln x \)
- Do Logarithmic Differentiation
- Find the linearization of a function at a point.
- Calculate the differential, \( dy \), of \( f(x) \)
- Use linear approximations and differentials to approximate changes in \( f(x) \), and calculate the error, the relative error, and the percent error of the approximation.
- Do simple related rates problems
- Find the absolute and local extrema of \( f(x) \) (on its domain and on a specified interval)
- Find the critical numbers of \( f(x) \).
- Use the Mean Value Theorem to answer questions
- Determine the intervals on which \( f(x) \) is increasing, decreasing, concave up, and concave down, and locate the local extrema of \( f(x) \) (using the first and second derivative tests).
- Find the vertical and horizontal asymptotes of \( f(x) \).
- Use information above to sketch a good graph of \( f(x) \).

**Recommended Review Problems** (Start with some odd-numbered problems, and do more if needed):

Any homework problems

**Ch. 3 Review**
- T/F Quiz (p. 248) #’s 3, 4, 5, 7, 8, 9, 10, 12
- Exercises (p. 248) #’s 1-46, 47ab, 48c, 49-62, 65, 71, 73, 75

**Ch. 4 Review**
- T/F Quiz (p. 323) #’s 1-11
- Exercises (p. 324) #’s 1-17, 23, 24, 35, 37