

## Homework #5: Sections 7.2\*, 7.3\*, and 7.4\*

Complete each question below. Answers should be carefully written up, showing all necessary work for each step to complete each problem. Your turned-in work should be neat and legible. If I cannot understand or follow your work you will not get credit for it. You may discuss these problems with myself, the TAs and Math Center tutors, and your classmates, but once you start writing up the problem to turn in, you must complete the write-up on your own. This assignment is out of **35 points**. It is due at the **start of class on Tuesday, September 29**.

1. (Optional) You may complete test corrections. For every question or question part on which you received points off, you may rewrite your answer to receive up to half of the points back. You may **not** get your answers from anyone else.
2. (10 points) Graph the function  $f(x) = e^{x^3-x}$ . Show all intercepts, asymptotes, critical points, and inflection points. You may use your calculator or computer to help you estimate the values of any inflection points, but justify your work.
3. (5 points) Find  $\frac{d}{dx}(x^{\cos x})$ . Be careful!
4. (5 points) Suppose you know that a certain exponential function  $f(x) = Ca^x$  goes through the points  $(1, 1)$  and  $(3, 4)$ . Find the values of  $C$  and  $a$ .
5. (5 points) Find  $\lim_{t \rightarrow \infty} (1 + \frac{2}{t})^t$ .
6. (5 points) Find the equation of the tangent line to the function  $f(x) = \frac{e^x}{x}$  at  $x = 2$ .
7. (5 points) Find all real values  $x$  such that  $\ln(x + 2) + \ln(x - 3) = 1$ .