Individual Homework #4: Due October 15, 2014

Please **read** Sections 3.6 and 5.1, and **do:** exercises 1–4, 6, 10abc, 11, 12, and 14, Section 3.6 (pages 164–166); exercises 1acefgijkop, 2abcdfhikl, 5, 8, 9, 11, 12, Section 5.1 (pages 286–288).

SOME HINTS AND NOTES:

- For exercise 10a, page 166, you should sketch the graph of y (NOT of y'), and zoom in until you can read off, from that graph, the point where the function peaks, to two decimal places accuracy. Again, when the text says "to two decimal place accuracy," they mean "so that there's uncertainty at worst in the third decimal place."

  So you might begin, by entering into MATLAB, the code

  ```
  ezplot('1/(3*x^2-5*x+7)',[0,2]), xlabel('x'),ylabel('y')
  ```

  It should be clear from the graph that the function peaks somewhere between $x = 0.8$ and $x = 0.9$, so you could now type in

  ```
  ezplot('1/(3*x^2-5*x+7)',[.8,.9]), xlabel('x'),ylabel('y')
  ```

  Keep going (you can also use the Zoom In feature on the figure toolbar) until you can pinpoint the point x at which the graph peaks to two-decimal place accuracy.

  Please include your graph with your HW (you need only include the final graph–the one where you can see the peak to two-decimal place accuracy).

- For exercise 2l, page 287, use the microscope equation for the function $h(t) = f(t)/g(t)$, with $a = 2$ and $\Delta t = -0.05$ (and use the quotient rule to express $h'(t)$ in terms of known quantities).

- For exercises like 8, 9, 11, 12, pages 288–289, your strategy should be to first model the quantities in question with an equation. For example, consider exercise 8, which is asking for information about per capita energy consumption. "Per capita" means per person. So per capita energy consumption, call it $e(t)$, would equal total energy consumption, call it $T(t)$, divided by population, call it $P(t)$:

$$e(t) = \frac{T(t)}{P(t)}.$$

  Further, you can differentiate, using an appropriate rule, to get a formula for $e'(t)$.