HW 8-1 (Due Nov. 1, 2016)   **Name:**

Print then work on it directly. Staple HW 8-1 and 8-2 together.

Problem 1

4.71   Wires manufactured for use in a computer system are specified to have resistances between
.12 and .14 ohms. The actual measured resistances of the wires produced by company A have
a normal probability distribution with mean .13 ohm and standard deviation .005 ohm.

    a   What is the probability that a randomly selected wire from company A's production will
meet the specifications?

    b   If four of these wires are used in each computer system and all are selected from com-
pany A, what is the probability that all four in a randomly selected system will meet the
specifications?

Problem 2

4.88   The magnitude of earthquakes recorded in a region of North America can be modeled as having an exponential distribution with mean 2.4, as measured on the Richter scale. Find the probability that an earthquake striking this region will

a   exceed 3.0 on the Richter scale.

b   fall between 2.0 and 3.0 on the Richter scale.

Problem 3

4.89   The operator of a pumping station has observed that demand for water during early afternoon hours has an approximately exponential distribution with mean 100 cfs (cubic feet per second).

    a   Find the probability that the demand will exceed 200 cfs during the early afternoon on a randomly selected day.

    b   What water-pumping capacity should the station maintain during early afternoons so that the probability that demand will exceed capacity on a randomly selected day is only .01?

Problem 4

4.91 If Y has an exponential distribution and $P(Y > 2) = .0821$, what is

    a $\beta = E(Y)$?

    b $P(Y \leq 1.7)$?

Problem 5

4.104 The lifetime (in hours) Y of an electronic component is a random variable with density function given by

$$f(y) = \begin{cases} \dfrac{1}{100}e^{-y/100}, & y > 0, \\ 0, & \text{elsewhere.} \end{cases}$$

Three of these components operate independently in a piece of equipment. The equipment fails if at least two of the components fail. Find the probability that the equipment will operate for at least 200 hours without failure.