HOMEWORK: SAMPLING DISTRIBUTIONS

These problems require that you read and understand the central limit theorem.

PROBLEM 1.
A laptop manufacturer finds that the average time it takes an employee to load a laptop with software is 50 minutes with a standard deviation 20 minutes. Suppose you take a random sample of 100 employees. The standard deviation of the sample mean is:

PROBLEM 2.
A company that manufactures bookcases finds that the average time it takes an employee to build a bookcase is 25 hours with a standard deviation of 9 hours. A random sample of 81 employees is taken. What is the likelihood that the sample mean will be 26 hours or more?

PROBLEM 3:

The average grade point average (GPA) of undergraduate students in New York is normally distributed with a population mean of 2.5 and a population standard deviation of .5. Compute the following, **showing all work**:

(I) The percentage of students with GPA's between 1.3 and 1.8 is: (a) less than 5.6%
(b) 5.7%   (c) 5.9%   (d) 6.2%   (e) 6.3%   (f) 6.6%   (g) 7.3%   (h) 7.5%
i) 7.9%   (j) more than 8%.

(II) The percentage of students with GPA's above 3.6 is: (a) less than 1%   (b) 1.2%   (c) 1.4%   (d) 1.6%   (e) 1.9%   (f) 2.2%   (g) 2.5%   (h) 2.7%   (i) 3.0%   (j) more than 3%.

(III) Above what GPA will the top 3% of the students be (i.e., compute the 97th percentile):
(a) less than 2.98   (b) 2.98   (c) 3.04   (d) 3.14   (e) 3.22   (f) 3.31   (g) 3.44
(h) 3.57   (i) 3.64   (j) more than 3.64.

(IV) If a sample of 25 students is taken, what is the probability that the sample mean GPA will be between 2.50 and 2.75? (a) less than .10   (b) .122   (c) .243   (d) .307   (e) .346
(f) .38 (g) .42   (h) .44   (i) .494   (j) more than .494. To do this problem, you must know the central limit theorem.