HW ON STAT 319, TERM 121 ON CONTINUOS PROBABILITY MODELS, DUE 15 OCT, 2012

D.1 The tensile strength of a metal part is normally distributed with mean 40 lb and standard deviation 5 lb. If 50000 parts are produced,

a. how many would you expect to fail to meet a minimum specification limit of 35 lb tensile strength?
b. how many would have a tensile strength in excess of 48 lb?

D.2 A manufacturer of electric calculators offers a one –year warranty. If the calculator fails for any reason during the period it is replaced. The time to failure is modeled by the following probability density function:

$$f(x) = ce^{-0.125x}, \quad 0 \le x; \qquad f(x) = 0, \quad x < 0;$$

where c is a normalizing constant.

a. Determine c.

b. What percentage of calculators will fail within the warranty period?

c. The manufacturing cost of a calculator is \$50 and the profit per sale is \$25. What is the effect of warranty replacement on profit.

(Montgomery, D.C. ( ) Statistical Quality Control: A Modern Introduction, p101).

D.3 A courier service guarantees absolutely that priority overnight packages will be delivered the next day by 10:30 am. Suppose that management has found that the delivery times are normally distributed with mean delivery time at 10:00 am and a standard deviation of 12 minutes. By what time can the management expect 90% of packages to be delivered?

D.4 Waiting time, in minutes, in a bus stop is uniformly distributed in $(0, 30)$.

a. Find the probability that one has to not more than 25 minutes. Name it in percentile.
b. What is the 95th percentile of the waiting time?
c. What is the probability that a passenger will wait for the bus indefinitely?