Problem # 1

Assume $Z$ follows a standard normal distribution, find

a- $z_o$ such that $P(Z > z_o) = .5$.

b- $z_o$ such that $P(-z_o < Z < z_o) = .5$. What percentiles do $-z_o$ and $z_o$ represent?

c- $z_o$ such that $P(Z > z_o) = .975$

d- $z_o$ such that $P(Z > z_o) = .3594$

e- $z_o$ such that $P(-z_o < Z < z_o) = .95$

Problem # 2

A used-car dealership has found that the length of time before a major repair is required on the cars it sells is normally distributed, with a mean equal to 10 months and a standard deviation of 3 months. If the dealer wants only 5% of the cars to fail before the end of the guarantee period, for how many months should the cars be guaranteed?

Problem # 3

The life span of a type of automatic washer is approximately normally distributed, with mean and standard deviation equal to 3.1 and 1.2 years, respectively. If this type of washer is guaranteed for 1 year, what fraction of original sales will require replacement?

Problem # 4

A soft drink machine can be regulated to discharge an average of $\mu$ ounces per cup. If the ounces of fill are normally distributed, with standard deviation equal to .3 ounce, give the setting for $\mu$ so that 8-ounce cups will overflow only 1% of the time.

Problem # 5

The Biology Data Book reports that the gestation time for human babies averages 278 days with a standard deviation of 12 days. Suppose that these gestation times are normally distributed.

a- Find the upper and lower quartiles for the gestation times.

b- Would it be unusual to deliver a baby after only 6 months of gestation? Explain.
Problem # 6

The scores on a certain test were approximately normally distributed with a mean of 540 and a standard deviation of 110.

a- If you achieved a score of 680, how far, in standard deviations, did your score depart from the mean?

b- What percentages of those who took the examination scored higher than you?

Problem # 7

Records show that the average length of time required to complete the introductory statistics final test was found to equal 70 minutes, with a standard deviation of 12 minutes. When should the test be terminated if you wish to allow sufficient time for 90% of the students to complete the test? (Assume that the time required to complete the test is normally distributed.)

Problem # 8

Fast Auto Service provides oil and lube service for cars. It is known that the mean time taken for oil and lube service at this garage is 15 minutes per car and the standard deviation is 2.4 minutes. The management wants to promote the business by guaranteeing a maximum waiting time for its customers. If a customer's car is not serviced within that period, the customer will receive a 50% discount on the charges. The company wants to limit this discount to at most 5% of the customers. What should the maximum guaranteed waiting time be? Assume that the times taken for oil and lube service for all cars have a normal distribution.