Problem # 1. Find the 50-th percentile (median), the 25-th percentile (first quartile),
the 75-th percentile (third quartile), for random variable with the probability density
pdf $f(x) = 4 x^3$, $0 < x < 1$. (Hint: Calculate the cdf $F(x)$).

Problem # 2. Of the customers visiting the stereo section of a large electronics store,
only 25% make a purchase. If 70 customers visit the stereo section tomorrow, find the
probability that more than 20 will make a purchase.

Problem # 3. According to the children's growth chart that doctors use as a reference,
the heights of 2-year-old boys are nearly normally distributed with a mean of 34.5
inches and a standard deviation of 1.3 inches.
If a 2-years-old boy is selected at random, what is the probability that he will be between
33.5 and 36.7 inches tall?

Problem # 4. In a study on the nutritional qualities of fast foods, the amount of fat
was measured for a random sample of 35 hamburgers of a particular restaurant
chain. The sample mean and standard deviation were found to be 30.2 and 3.8
grams, respectively.
Use these data to construct a 95% confidence interval for the mean fat content $\mu$
in hamburgers served in these restaurants.

Problem # 5. The time to blossom of 21 plants has sample mean = 39 days and sample
standard deviation $s = 5.1$ days, Give a 99% confidence interval for the mean time $\mu$
to blossom.

Problem # 6. Rural and urban students are to be compared on the basis of their scores on
a national musical aptitude test. Two random samples of sizes 90 and 100 are selected
from rural and urban seventh grade students. The summary statistics from the test score
are:
Rural: $n_1 = 90$, sample mean $= 76.4$, $s_1 = 8.2$
Urban: $n_2 = 100$, sample mean $= 81.2$, $s_2 = 7.6$.
Establish a 98% confidence interval for the difference in population mean scores between
rural and urban students.

Problem # 7. The following are the weights, in decagrams, of 10 packages of grass seed
Distributed by a certain company:
46.4  46.1  45.8  47.0  46.1  45.9  45.8  46.9  45.2  46.0
Find a 95% confidence interval for the mean of all such packages of grass seed
distributed by this company, assuming a normal population.