Math 477, Homework 6

Name: _____

Net ID: _____

1. A filling station is supplied with gasoline once a week. The amount that they sell in a week, measured in thousands of gallons, is a random variable X with probability density function

$$f(x) = \begin{Bmatrix} 5(1-x)^4 & x \in [0,1] \\ 0 & \text{else} \end{Bmatrix}$$

how much gas should they have at the station so that the probability of the supply being totally exhausted by the end of the week is 1/100?

2. A point is chosen on a line segment of fixed length L, and is then broken into two parts at the chosen point. What is the probability that the smaller part is no more than 1/4 the length of the longer part?

3. The time, in hours, required to fix a machine is an exponential variable with parameter $\lambda = 1/2$.
   (a) What is the probability that the repair time exceeds 2 hours?

   (b) What is the conditional probability that the repair time exceeds 10 hours, assuming it takes at least 9 hours?

4. If a die is rolled 10 times, estimate with a normal distribution the probability that it comes up heads exactly 5 times.