EE380 2nd monthly Test (FA) fall 2017

Q1. (4 pts) 30 samples were taken from an infinite population of normal distribution N(4,9). Please find the variance of these 30 samples and use this sampling statistics to calculate the probability that these 30 samples have a mean value greater than 9. (Central Limit Theory)

Q2. (6 pts) A fair die has 4 faces; two faces marked ‘1’ and other two faces marked as ‘2’. Each throw, the number facedown the table is recorded. To throw this die 40 times. Please answer the following questions. (Chi-square test)

1. Give the degree of freedom
2. Give expected numbers of ‘1’ and ‘2’.
3. What is the critical value of the 90% confidence?
4. List the numbers of ‘1’ and ‘2’after 40 throws for a fair die.

Q3. (6 pts) The life time of a product is described by exponential distribution with an average of 8 months. (exponential distribution, conditional probability, binomial)

1. What is the probability to have operation longer than 2 years?
2. What is the probability that a product can exist 5 years given that can survive for 3 years?
3. If 6 samples started operation together, what is the probability to have 2 to operation after 2 years?

Q4. (6 pts) A grocery owner purchased 20000 pears and sampled 25 of them (without replacement); the average of these samples is 112 grams and the standard deviation of these samples is 6 grams.

1. What is the probability to have these sampled pears between 106 and 118 grams?
2. And also give the number of pears.
3. If the average of 25 pears is equal to that of population and the standard deviation of whole population could also be transferred from the sample, what is the probability to have pears between 100 and 124 grams (whole population)?
4. And how many pears of whole population have weight between 100 and 124 grams?