Question # 1 (15 marks)

The T.O. Supplies Company buys 20 calculators from a supplier. The probability that a randomly chosen calculator is defective is 3%. If there are more than 2 defective calculators, the entire batch of 20 calculators will be returned.

A) Find the expected number of defective calculators bought by the company

B) Find the variance of the number of defective calculators

C) Find the standard deviation of the number of defective calculators.

D) Calculate the probability that the company receives no defective calculator.

E) Calculate the probability that the company receives exactly 2 defective calculators.

F) Calculate the probability that the company returns the entire batch.

G) Now suppose that the defective probability changes from 3% to 5%. Find the probability the company receives more than 1 but less than 6 defective calculators.

H) Suppose again that the defective probability changes from 3% to 5%. Find the probability the company receives at least 16 **good** calculators.

Question #2 (15 marks)

Deans and other faculty members in professional schools often monitor how well the graduates of their program fare in the job market. Information about the types of jobs and their salaries may provide useful information about the success of a program.

In advertisements for a large university, the dean of the School of Business claims that the weekly salary of the school's graduates 1 year after graduation is normally distributed with a mean of $1,200 and a standard deviation of $400. A second year student in the business school who has just completed his statistics course would like to check whether the claim about the mean is correct. He does a survey of 100 randomly chosen people who graduated 1 year earlier and determines their weekly salary.

A) What is the sampling distribution of the mean of 100 graduate's weekly salary?

B) What is the standard error of the sampling distribution of the mean of 100 graduates' weekly salary.

C) Now suppose that the sample mean is $1,000. If the dean's claim is justified, what is the probability of observing a sample mean as low as this result?

D) Suppose again that the sample mean is $1,100. Estimate the population mean of the weekly salary with 95% confidence.

E) What is the approximate sample size required to estimate the population mean to within $100? Assume the confidence level is to be 99%.

Question # 1 (Answer Key)

1A	0.6
1B	0.582
1C	0.7629
1D	0.5438
1E	0.0988
1F	0.021
1G	0.2639
1H	0.9974

Question # 2 (Answer Key)

2A	Normal Distribution
2B	40
2C	0.9999
2D	($1021.60, $1178.40)
2E	107