PROBABILITY

**Question 1**

A company employs 400 salespeople. Of these, 83 received a bonus last year, 100 attended special training program at the beginning of last year, and 42 both attended the special sales training and received a bonus. (Note: Bonus was based totally on sales performance.)

1. What proportion of the 400 salespeople received a bonus last year?
2. What proportion of the 400 salespeople attended the special sales training program at the beginning of last year?
3. What proportion of the 400 salespeople both attends the special sales training program and received a bonus?
4. What proportion of the salespeople who attended the special sales training program received a bonus?
5. What proportion of the 400 salespeople did not attend the sales training program and did not receive a bonus?

**Question 2**

Airplanes arrive at a certain airport at the rate of 4 per hour according to the Poisson

Distribution.

1. What is the probability that there will be exactly 5 arrivals in a given 1 hour period?
2. What is the probability that there will be three or more arrivals in a given 1 hour period?
3. What is the probability that there will be less than 3 arrivals in a given 1 hour period?
4. What is the probability that there will be exactly 10 arrivals in a given 2 hour period?

**Question 3**

Warranty records show that the probability that a new car needs a warranty repair in the first 90 days is 0.05. If a sample of three new cars is selected.

1. What is the probability that none needs repair?
2. What is the probability that at least one needs a warranty repair?
3. What is the probability that more than one needs repair?

**Question 4**

You are trying to set up a portfolio that consists of a corporate bond fund and a common stock fund. The following information about the annual return (per $1000) of each of these investments under different economic conditions is available, along with the probability that each of these economic conditions will occur.

Probability State of the Economy Corporate Bonds Common Stocks

0.10 Recession -$30 -$150

0.15 Stagnation $50 -$20

0.35 Slow Growth $90 $120

0.30 Moderate Growth $100 $100

0.10 High Growth $110 $250

1. Compute the expected return for corporate bonds and common stocks.
2. Compute the standard deviation for each fund.
3. Which would you invest? Why?

## Question 5

The manager of the commercial mortgage department of a large bank has collected data during the past two years concerning the number of commercial mortgages approved per week. The results from these two years (104 weeks) indicated the following:

**Number of Commercial Frequency**

 **Mortgages Approved**

 0 13

 1 25

 2 32

 3 17

 4 9

 5 6

 6 1

 7 1

a) Calculate the expected number of mortgages approved per week.

b) Compute the standard deviation.