

**STAT 205**  
**Fall 2006**  
**Exam 1**

**Name:** \_\_\_\_\_

$$s^2 = \frac{\sum_{i=1}^n (y_i - \bar{y})^2}{(n-1)}$$

$$P\{E_1 \cup E_2\} = P\{E_1\} + P\{E_2\} - P\{E_1 \cap E_2\}$$

$$P\{E_1 \cap E_2\} = P\{E_1\}P\{E_2|E_1\}$$

$$\mu_Y = \sum y_i P\{Y = y_i\}$$

$$\sigma_Y^2 = \sum (y_i - \mu_Y)^2 P\{Y = y_i\}$$

$$= E(Y^2) - (E(Y))^2$$

$$P\{Y = j\} = {}_n C_j p^j (1-p)^{n-j}$$

$$\mu_Y = np$$

$$\sigma_Y^2 = np(1-p)$$

$$Z = \frac{(Y - \mu)}{\sigma}$$

Part I: Answer eight of the following nine questions. If you complete more than eight, I will grade only the first eight. Five points each.

1)  $P\{A\} = 0.2$   $P\{B\} = 0.40$  A and B are independent. **What is  $P\{A \cap B\}$ ?**

2)  $P\{A\} = 0.2$   $P\{B\} = 0.40$  A and B are mutually exclusive. **What is  $P\{A \cup B\}$ ?**

3)  $P\{A\} = 0.8$   $P\{A \cap B\} = 0.2$  **What is the probability of B given A?**

4) Circle the correct answer. In a breeding experiment, white chickens with small combs were mated and produced 190 offspring. Researchers observed the offspring to determine whether the offspring had

- White feathers, small comb
- White feathers, large comb
- Dark feathers, small comb
- Dark feathers, large comb

**The variable in this study is discrete / continuous / nominal / ordinal.**

5) The following data set is the weight gains(lbs.) in lambs fed a certain diet over a specified amount of time:

9, 16, 21, 11, 18

**Calculate the mean of this data.**

**Calculate the median of this data.**

6) An experiment, which fit the criteria for the BInS setting, was conducted using a sample size of 80 with the probability of a success equal to 0.6.

**What is the mean of this distribution?**

**What is the standard deviation?**

7) A graphical display shows that a particular data set is fairly symmetric and bell-shaped. **Approximately what percent of the data lie within 3 standard deviations of the mean?**

8) Circle the correct answer. A data entry clerk is entering some data from an experiment involving the number of seizures during an eight week period for each of 20 epilepsy patients. The data entry clerk mistypes one of the datum by either adding or deleting a 0 off the end. **The mean / median is most likely to be affected.**

9) Let  $Y$  denote the number of times a person can get chicken pox in his or her lifetime. A researcher reports the following probability distribution for  $Y$ :

Y	0	1	2
P{Y}	.01	.86	.13

**Find  $\mu_Y$**

**Find  $\sigma_Y$**

Part II: Answer every part of the next three problems. Read each question carefully, and show your work for full credit.

1) (24 pts.) In the United States, 11% of adolescent girls have iron deficiency. Suppose six adolescent girls are chosen at random.

a) Find the probability that at most one of these six girls will be iron deficient.

b) Find the probability that 2 or more of these girls will be iron deficient.

2) (24 pts.) The brain weights of a certain population of adult Swedish males follow a normal distribution with mean  $\mu = 1400\text{g}$  and standard deviation  $\sigma = 100\text{g}$ .

a) What percentage of the brain weights for this population are between 1200 and 1600 grams?

b) What is the 80<sup>th</sup> percentile for this distribution?

3) (12 pts.) A researcher measured the weights(g) of 19 woodchucks. The researcher is hoping to use a statistical test which requires the assumption of the data coming from a normal population. Using the QQplot below, discuss whether this assumption appears to be met or violated and why. One or two sentences should suffice...

