

**A.P. Statistics**  
**Assignment 5-2**

**Remember to show your thinking through your work.**

1. Approximately 2% of the nation's children (about 1.7 million) have a parent who is in jail or prison. Let  $X$  be the number of children that have an incarcerated parent from a random sample of 100 children.

a. Verify that this is a binomial setting and write it in notation.

b. Describe what  $P(X=0)$  means in context.

c. Find  $P(X=0)$  and  $P(X=1)$ .

d. What is the probability that two or more of the children have a parent in jail or prison.

2. A child of a specific set of parents has a 0.2 chance of having type O blood. Suppose these parents have 4 children. Let  $X$ =the number of children having type O blood.

a. Verify that this is a binomial setting and write the notation  $(B(n,p))$ .

b. What is the probability that exactly 2 of the children have type O blood?

c. Make a probability distribution table for  $X = 0$  to 4. Verify that the sum of these probabilities is 1.

d. Construct a histogram of the probability distribution.

3. Dilbert forgot to study for the multiple-choice exam. Each question has four choices and there are 50 questions. Dilbert, in his infinite wisdom, decides to randomly guess on each problem. Find the probability for each:

a. If Dilbert gets 30 or more right, he will be named the company CEO.

b. If Dilbert gets 20 to 29 right, he will be promoted and get a 10% raise.

c. If Dilbert gets 10 to 19 right, he will get to keep his menial job and pay.

d. If Dilbert gets less than 10 right, he will be kicked out of cubicle central and unemployed.

4. A new antibiotic is effective for 85% of infections. The antibiotic is given to 40 patients.

a. Verify that this is a binomial setting and write it in notation.

b. Describe what  $P(X=35)$  means in context.

c. What is the probability that the antibiotic will work in at least 35 of the 40 patients?

d. What is the probability that the antibiotic will work in less than half of the patients?