

**AP Statistics**  
**Special Problem 6 (S2018)**

**Name:**

**Directions:** *This is an individual assignment. You may use your book or notes but no other outside resources including the internet.* Complete the following problems as you would on the AP Exam. Show all your work. Indicate clearly the methods you would use, because you will be graded on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

1. For an upcoming event, each customer can purchase up to 3 child tickets and 3 adult tickets. Let  $C$  be the number of child tickets purchased by a single customer. The probability distribution of the number of child tickets purchased by a single customer is given below:

|      |     |     |     |     |
|------|-----|-----|-----|-----|
| C    | 0   | 1   | 2   | 3   |
| P(C) | 0.4 | 0.2 | 0.3 | 0.1 |

a. Compute the mean and standard deviation of  $C$ .

b. Suppose that the mean and standard deviation for the number of adult tickets purchased by a single customer are 2 and 1.4 respectively. Assume that the number of child tickets and number of adult tickets purchased are independent random variables. Compute the mean and standard deviation of the total number of adult and child tickets purchased by a single customer.

c. Suppose each child ticket costs \$10 and each adult ticket costs \$20. Compute the mean and standard deviation of the total amount spent per purchase.

2. In order to be used in professional tournaments, golf balls must meet a set of five standards. One of the standards is the distance the ball travels. When a ball is hit by a mechanical driver at a specified setting the distance the ball travels cannot be further than 291.2 yards. Manufacturers want to produce balls that will travel as close to 291.2 yards but not exceed it. The Acme Golf Ball Company has determined that the distances traveled by the balls it makes are normally distributed with a standard deviation of 2.8 yards. Acme has a new manufacturing process that allows it to set the mean distance the ball will travel.

a. If Acme sets the mean distance to be equal to 288 yards, what is the probability that a randomly selected ball will travel too far?

b. Assuming that the mean distance is 288 yards and that four balls are independently tested. What is the probability that at least one of the four balls will travel beyond 291.2 yards?

c. If Acme wants to be 95 percent certain that a randomly selected ball will not travel beyond the maximum distance of 291.2 yards, what is the largest mean that can be used in the manufacturing process?