AP Statistics Chapter 7 Multiple Choice Review

A psychologist studied the number of puzzles subjects were able to solve in a five-minute period while listening to soothing music. Let X be the number of puzzles completed successfully by a subject. X had the following distribution:

X	1	2	3	4
Probability	0.2	0.4	0.3	0.1

1. Using the above data, what is the probability that a randomly chosen subject completes at least 3 puzzles in the five-minute period while listening to soothing music?
(a) 0.3
(b) 0.4
(c) 0.6
(d) 0.9
(e) The answer cannot be computed from the information given.

2. Using the above data, P(X < 3) is
(a) 0.3
(b) 0.4
(c) 0.6
(d) 0.9
(e) The answer cannot be computed from the information given.

3. Using the above data, the mean μ of X is
(a) 2.0
(b) 2.3
(c) 2.5
(d) 3.0
(e) The answer cannot be computed from the information given.

4. Which of the following random variables should be considered continuous?
(a) The time it takes for a randomly chosen woman to run 100 meters
(b) The number of brothers a randomly chosen person has
(c) The number of cars owned by a randomly chosen adult male
(d) The number of orders received by a mail order company in a randomly chosen week
(e) None of the above

AP Statistics Chapter 8 Multiple Choice Review

5. A dealer in the Sands Casino in Las Vegas selects 40 cards from a standard deck of 52 cards. Let Y be the number of red cards (hearts or diamonds) in the 40 cards selected. Which of the following best describes this setting:
(a) Y has a binomial distribution with $n = 40$ observations and probability of success $p = 0.5$.
(b) Y has a binomial distribution with n=40 observations and probability of success $p = 0.5$, provided the deck is shuffled well.
(c) Y has a binomial distribution with n=40 observations and probability of success $p = 0.5$, provided after selecting a card it is replaced in the deck and the deck is shuffled well before the next card is selected.
(d) Y has a normal distribution with mean $p = 0.5$.

6. In a certain large population, 40% of households have a total annual income of over $70,000. A simple random sample is taken of 4 of these households. Let X be the number of households in the sample with an annual income of over $70,000 and assume that the binomial assumptions are reasonable. What is the mean of X?
(a) 1.6
(b) 28,000
(c) 0.96
(d) 2, since the mean must be an integer
(e) The answer cannot be computed from the information given.

7. The probability that a three-year-old battery still works is 0.8. A cassette recorder requires four working batteries to operate. The state of batteries can be regarded as independent, and four three-year-old batteries are selected for the cassette recorder. What is the probability that the cassette recorder operates?
(a) 0.9984
(b) 0.8000
(c) 0.5904
(d) 0.4096
(e) The answer cannot be computed from the information given.

8. Twenty percent of all trucks undergoing a certain inspection will fail the inspection. Assume that trucks are independently undergoing this inspection, one at a time. The expected number of trucks inspected before a truck fails inspection is
(a) 2
(b) 4
(c) 5
(d) 20
(e) The answer cannot be computed from the information given.

Chapter 7/8 Practice Free Response

9. A box contains ten $1 bills, five $2 bills, three $5 bills, one $10 bill, and one $100 bill. A person is charged $20 to select one bill. Define the random variable X as the amount on the random bill.

(a) Construct the probability distribution for X.

(b) Find the expected value for X.

(c) Taking into account that it costs $20 to play this game, is the game fair? Explain.

10. Amarillo Slim, a professional dart player, has an 80% chance of hitting the bullseye on a dartboard with any throw. Suppose that he throws 10 darts, one at a time, at the dartboard.

(a) Find the probability that Slim hits the bullseye exactly six times.

(b) Find the probability that he hits the bullseye at least four times.

(c) Compute the mean of the number of bullseyes in 10 throws.

(d) Find the probability that Slim's first bullseye occurs on the fourth throw.

(e) Find the probability that it takes Amarillo more than 2 throws to hit the bullseye.

11. Harlan comes to class one day, totally unprepared for a pop quiz consisting of ten multiple-choice questions. Each question has five answer choices, and Harlan answers each question randomly.

(a) Find the probability that Harlan guesses more answers correctly than would be expected by chance.

(b) Find the probability that Harlan's first correct answer occurs on or after the fourth question.

Answers to the Review for Chapters 7 and 8

Multiple Choice

Chapter 7

1. b **2**. c **3**. b **4**. a

Chapter 8

5. c **6. a** **7. d** **8. c**

Free Response

9. A box contains ten \$1 bills, five \$2 bills, three \$5 bills, one \$10 bill, and one \$100 bill. A person is charged \$20 to select one bill. Define the random variable X as the amount on the random bill.

(a)

X	\$1	\$2	\$5	\$10	\$100
P(X)	.5	.25	.15	.05	.05

(b) $\mu_x = \$1(.5) + \$2(.25) + \$5(.15) + \$10(.05) + \$100(.05) = \$7.25$

(c) No it is not fair; you stand to lose way too much money every time you play. The expected return per play is \$7.25 – \$20.00 = -\$12.75. So you will lose \$12.75 per play, on average.

10. Amarillo Slim, a professional dart player, has an 80% chance of hitting the bullseye on a dartboard with any throw. Suppose that he throws 10 darts, one at a time, at the dartboard.

(a) *Binomial*: $P(X = 6) = \frac{10!}{6!4!}(.8)^6(.2)^4 = .088$.

(b) *Binomial*: $P(X \geq 1) = 1 - P(X \leq 3) = 1 - binomcdf(10,.8,3) = .999$.

(c) *Binomial*: $\mu = np = 10(.8) = 8$.

(d) *Geometric*: $P(X = 4) = (.2)^3(.8) = .0064$.

(e) *Geometric*: $P(X > 2) = (.2)^2 = .04$.

11. Harlan comes to class one day, totally unprepared for a pop quiz consisting of ten multiple-choice questions. Each question has five answer choices, and Harlan answers each question randomly.

(a) *Binomial* expected $= np = 10(.2) = 2$. So we are looking for the probability that $X > 2$.

$P(X > 2) = 1 - P(X \leq 1) = 1 - binomcdf(10,.2,1) = .624$.

(b) *Geometric*: $P(X > 3) = (.8)^3 = .512$.