AP Statistics Chapter 6 Review Name ANSWER KEY

Part I - Multiple Choice (Questions 1-10) - Circle the answer of your choice.

1. Sixty-five percent of all divorce cases cite incompatibility as the underlying reason. If four couples file for a divorce, what is the probability that exactly two will state incompatibility as the reason?

$n = 4 \quad p = .65$

$P(x=2) = (4, .65, 2) = .311$ (BINOPDF)

(a) .104.
(b) .207
(c) .254
(d) .311
(e) .423

2. Which of the following are true statements?

True I. The histogram of a binomial distribution with p = .5 is always symmetric.
II. The histogram of a binomial distribution with p = .9 is skewed to the right.
True III. The histogram of a geometric distribution with is always decreasing. → AND Always skewed Right

(a) I and II
(b) I and III
(c) II and III
(d) I, II, and III
(e) None of the above gives the complete set of complete responses.

3. Binomial and geometric probability situations share many conditions. Identify the choice that is not shared.

(a) The probability of success on each trial is the same.
(b) There are only two outcomes on each trial.
(c) The focus of the problem is the number of successes in a given number of trials.
(d) The probability of a success equals 1 minus the probability of a failure.
(e) The mean depends on the probability of a success.

4. An inspection procedure at a manufacturing plant involves picking thirty items at random and then accepting the whole lot if at least twenty-five of the thirty items are in perfect condition. If in reality 85% of the whole lot is perfect, what is the probability that the lot will be accepted?

$P(x \geq 25) = 1 - \text{binomial cdf}(30, .85, 24) = .711$

(a) .524
(b) .667
(c) .186
(d) .476
(e) .711

5. A recent study of the WA Upper School student body determined that 41% of the students were "chic". If Mr. Floyd has developed a test for "chic-ness", what is the average number of students we would need to test in order to find one who is "chic"?

$\mu = \frac{1}{p} = \frac{1}{.41} = 2.43$

(a) 2
(b) 2.43
(c) 3
(d) 3.57
(e) 1, because the study is clearly in error since all WA students are "chic"

6. A student is randomly generating 1-digit numbers on his TI-83. What is the probability that the first "4" will be the 8th digit generated?

{0, 1, 2, 3, 4, 5, 6, 7, 8, 9}

$p = .1 \quad n = 10$

$P(x = 8) =$ geompdf(.1, 8) =

(a) .053
(b) .082
(c) .048
(d) .742
(e) .500

7. The color distribution in a bag of Reese's Pieces was found to be 13 brown, 22 orange, and 15 yellow. If a piece is randomly drawn and replaced, what is the probability that it will take less than 8 draws to get an orange piece?

geometcdf(.44, 7) =

(a) .014
(b) .008
(c) .990
(d) .983
(e) .500

8. A probability experiment involves a series of identical, independent trials with two outcomes (success/failure) per trial and the probability of a success on each trial is 0.1. Determine the number of trials, n, in a binomial experiment such that the expected number of successes in that binomial experiment will be equal to the expected number of trials in a geometric experiment.

$\frac{1}{p} = n \cdot p$

$\frac{1}{0.1} = n(0.1)$

$10 = 0.1n$

$100 = n$

(a) 2
(b) 5
(c) 10
(d) 50
(e) 100

9. Which of the following statements is NOT correct?

(a) The number of successes that corresponds to the maximum value of a binomial PDF is within one unit of it's mean.
(b) A geometric PDF is always decreasing.
(c) A binomial PDF with $p < .5$ will be skewed right.
(d) As the number of trials in a geometric situation increases and the number of successes in a binomial situation increases, the value of the CDF approaches 0.
(e) A PDF can be transformed into a CDF by using addition.

10. The renowned soccer player, Levi Gupta scores a goal on 30% of his attempts. The random variable X is defined as the number of goals scored on 50 attempts.

BINOMIAL $\mu_x = n \cdot p = 50(.30) = 15$

$\sigma_x = \sqrt{np(1-p)} = \sqrt{50(.30)(.70)} = 3.24$

The renowned gambler, Mohammed Smith, wins at Blackjack 25% of the time. The random variable Y is defined as the number of games needed to win his first game.

Geom. $\mu_y = 1/p = 1/.25 = 4$

$\sigma_y = \frac{\sqrt{1-p}}{p} = \frac{\sqrt{.75}}{.25} = 3.46$

Define the random variable Z as the total number of soccer goals scored and blackjack games played. Determine the mean and standard deviation of the random variable Z.

(a) 11, 6.7
(b) 19, 6.7
(c) 11, 4.74
(d) 19, 4.74
(e) Cannot be determined with the given information.

$\mu_z = 15 + 4 = 19$ (x + y)

$\sigma_z = \sqrt{3.46^2 + 3.24^2}$ (y, x)