

AP Stats Random Variables Review

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. An ecologist studying starfish populations collects the following data on randomly-selected 1-meter by 1-meter plots on a rocky coastline.
- The number of starfish in the plot.
 - The total weight of starfish in the plot.
 - The percentage of area in the plot that is covered by barnacles (a popular food for starfish).
 - Whether or not the plot is underwater midway between high and low tide.
- How many of these measurements can be treated as continuous random variables and how many as discrete random variables?
- A. Three continuous, one discrete.
 - B. Two continuous, two discrete.
 - C. One continuous, three discrete.
 - D. Two continuous, one discrete, and a fourth that cannot be treated as a random variable.
 - E. One continuous, two discrete, and a fourth that cannot be treated as a random variable.
- ___ 2. 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
- ___ 3. A variable whose value is a numerical outcome of a random phenomenon is called
- A. a random variable.
 - B. a parameter.
 - C. biased.
 - D. a random sample.
 - E. a statistic.
- ___ 4. Which of the following is *not* a random variable?
- A. The number of heads in ten tosses of a fair coin.
 - B. The number of passengers in cars passing through a toll booth.
 - C. The age of the driver in cars passing through a toll booth.
 - D. The response of randomly-selected people to the question, "Did you eat breakfast this morning?"
 - E. The response of randomly-selected people to the question, "How many hours of sleep did you get last night?"
- ___ 5. Which of the following is *not* a random variable?
- A. The heights of randomly-selected buildings in New York City.
 - B. The suit of a card randomly-selected from a 52-card deck.
 - C. The number of children in randomly-selected households in the United States.
 - D. The amount of money won (or lost) by the next person to walk out of a casino in Las Vegas.
 - E. All of the above are random variables.
- ___ 6. Which of the following is true about every random variable

- I. It takes on numerical or categorical values.
- II. It describes the results of a random phenomenon.
- III. Its behavior can be described by a probability distribution.
- A. I only
- B. II only
- C. III only
- D. II and III
- E. All three statements are true

- ___ 7. A random variable is
- A. a hypothetical list of the possible outcomes of a random phenomenon.
 - B. any phenomenon in which outcomes are equally likely.
 - C. any number that changes in a predictable way in the long run.
 - D. a variable used to represent the outcome of a random phenomenon.
 - E. a variable whose value is a numerical outcome associated with a random phenomenon.

- ___ 8. Let X be the outcome of rolling a fair six-sided die. $P(2 \leq X < 5) =$
- A. $1/6$.
 - B. $1/3$.
 - C. $1/2$.
 - D. $2/3$.
 - E. $5/6$.

- ___ 9. Suppose there are three balls in a box. On one of the balls is the number 1, on another is the number 2, and on the third is the number 3. You select two balls at random and without replacement from the box and note the two numbers observed. The sample space S consists of the three equally likely outcomes $\{(1, 2), (1, 3), (2, 3)\}$. Let X be the sum of the numbers on two balls selected. Which of the following is the correct probability distribution for X ?

(A)

#	Prob
1	$1/3$
2	$1/3$
3	$1/3$

(B)

#	Prob
3	$1/3$
4	$1/3$
5	$1/3$

(C)

#	Prob
1	$1/6$
2	$2/6$
3	$3/6$

(D)

#	Prob
3	$1/6$
4	$2/6$
5	$3/6$

(E)

#	Prob
1	$1/4$
2	$1/4$
3	$1/4$

- A. A
- B. B
- C. C
- D. D
- E. E

- ___ 10. I roll a pair of fair dice and let $X =$ the sum of the spots on the two sides facing up. The probability that X is 2, 11, or 12 is
- A. $1/36$.
 - B. $2/36$.
 - C. $3/36$.
 - D. $4/36$.
 - E. $3/11$.

Scenario 6-1

Flip a coin four times. If $Z =$ the number of heads in four flips, then the probability distribution of Z is given in the table below.

Z	0	1	2	3	4
P(Z)	0.0625	0.2500	0.3750	0.2500	0.0625

- ___ 11. Use Scenario 6-1. An expression that represents the probability of at least one tail is
- $P(Z \geq 3)$.
 - $P(Z \leq 3)$.
 - $P(Z < 3)$.
 - $P(Z > 3)$.
 - $P(Z \geq 1)$.
- ___ 12. Use Scenario 6-1. The probability of at least one tail is
- 0.2500.
 - 0.3125.
 - 0.6875.
 - 0.9375.
 - none of these.

Scenario 6-2

In a particular game, a fair die is tossed. If the number of spots showing is either 4 or 5 you win \$1, if the number of spots showing is 6 you win \$4, and if the number of spots showing is 1, 2, or 3 you win nothing. Let X be the amount that you win.

- ___ 13. Use Scenario 6-2. Which of the following is the expected value of X ?
- \$0.00
 - \$1.00
 - \$2.50
 - \$4.00
 - \$6.00
- ___ 14. Use Scenario 6-2. Which of the following is the standard deviation of X ?
- \$1.00
 - \$1.35
 - \$1.41
 - \$1.78
 - \$2.00

Scenario 6-3

In a population of students, the number of calculators a student owns is a random variable X described by the following probability distribution:

X	0	1	2
P(X)	0.2	0.6	0.2

- ___ 15. Use Scenario 6-3. Which of the following is the mean of X ?
- 0.5
 - 1
 - 1.2
 - 2
 - The answer cannot be computed from the information given.

- ___ 16. Use Scenario 6-3. Which of the following is the standard deviation of X ?
- A. 1
 - B. 0.6325
 - C. 0.4472
 - D. 0.4
 - E. The answer cannot be computed from the information given.

Scenario 6-4

Number of cards	Payoff
10	\$1,000
1000	\$50
5000	\$5

In the Florida scratch-card lottery, the numbers and values of prizes awarded for every 100,000 cards sold are

- ___ 17. Use Scenario 6-4. The probability that a random scratch-card will pay off is
- A. .0250.
 - B. .0601.
 - C. .2500.
 - D. .6010.
 - E. .8500.
- ___ 18. Use Scenario 6-4. The expected payoff per card sold is
- A. \$1.00.
 - B. \$.90.
 - C. \$.85.
 - D. \$.50.
 - E. \$.25.

Scenario 6-5

A small store keeps track of the number X of customers that make a purchase during the first hour that the store is open each day. Based on the records, X has the following probability distribution.

X	0	1	2	3	4
$P(X)$	0.1	0.1	0.1	0.1	0.6

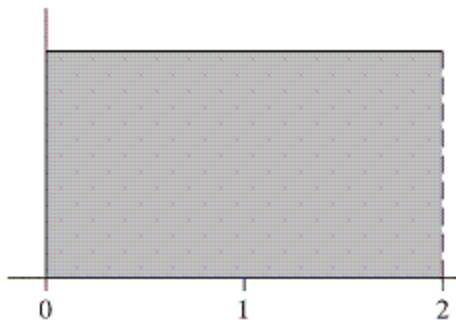
- ___ 19. Use Scenario 6-5. The mean number of customers that make a purchase during the first hour that the store is open is
- A. 2.0.
 - B. 2.5.
 - C. 2.9.
 - D. 3.0.
 - E. 4.0.
- ___ 20. Use Scenario 6-5. The standard deviation of the number of customers that make a purchase during the first hour that the store is open is
- A. 0.2.
 - B. 1.4.
 - C. 2.0.

- D. 3.0.
- E. 4.0.

- ___ 21. Use Scenario 6-5. Consider the following game. You pay me an entry fee of x dollars; then I roll a fair die. If the die shows a number less than 3 I pay you nothing; if the die shows a 3 or 4, I give you back your entry fee of x dollars; if the die shows a 5, I will pay you \$1; and if the die shows a 6, I pay you \$3. What value of x makes the game fair (in terms of expected value) for both of us?
- A. \$2
 - B. \$4
 - C. \$1
 - D. \$0.75
 - E. \$0.5
- ___ 22. Use Scenario 6-5. The density curve for a continuous random variable X has which of the following properties?
- A. The probability of any event is the area under the density curve between the values of X that make up the event.
 - B. The total area under the density curve for X must be exactly 1.
 - C. $P(X = a) = 0$ for any constant a .
 - D. The density curve lies completely on or above the horizontal axis.
 - E. All of the above.

Scenario 6-6

The probability distribution of a continuous random variable X is given by the density curve below.

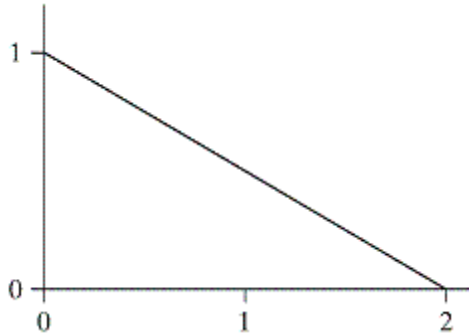


- ___ 23. Use Scenario 6-6. The probability that X is between 0.5 and 1.5 is
- A. $1/4$.
 - B. $1/3$.
 - C. $1/2$.
 - D. $3/4$.
 - E. 1.
- ___ 24. Use Scenario 6-6. The probability that X is *at least* 1.5 is
- A. 0.
 - B. $1/4$.
 - C. $1/3$.
 - D. $1/2$.
 - E. $3/4$.
- ___ 25. Use Scenario 6-6. The probability that $X = 1.5$ is
- A. 0.

- B. very small; slightly larger than 0.
- C. 1/4.
- D. 1/3.
- E. 1/2.

Scenario 6-7

Suppose X is a continuous random variable taking values between 0 and 2 and having the probability density function below.



- ___ 26. Use Scenario 6-7. $P(1 \leq X \leq 2)$ has value
 - A. 0.50.
 - B. 0.33.
 - C. 0.25.
 - D. 0.00.
 - E. none of these.
- ___ 27. Use Scenario 6-7. $P(X > 1.5)$ has value
 - A. 0.50.
 - B. 0.33.
 - C. 0.25.
 - D. 0.125.
 - E. 0.0625.
- ___ 28. The weight of written reports produced in a certain department has a Normal distribution with mean 60 g and standard deviation 12 g. The probability that the next report will weigh less than 45 g is
 - A. .1056.
 - B. .3944.
 - C. .1042.
 - D. .0418.
 - E. .8944.

Scenario 6-8

Let the random variable X represent the profit made on a randomly selected day by a certain store. Assume X is Normal with a mean of \$360 and standard deviation \$50.

- ___ 29. Use Scenario 6-8. The value of $P(X > \$400)$ is
 - A. 0.2881.
 - B. 0.8450.
 - C. 0.7881.
 - D. 0.2119.
 - E. 0.1600.

- ___ 30. Use Scenario 6-8. The probability is approximately 0.6 that on a randomly selected day the store will make less than which of the following amounts?
- A. \$330.00
 - B. \$347.40
 - C. \$361.30
 - D. \$372.60
 - E. \$390.00

Scenario 6-9

The weights of grapefruits of a certain variety are approximately Normally distributed with a mean of 1 pound and a standard deviation of 0.12 pounds.

- ___ 31. Use Scenario 6-9. What is the probability that a randomly-selected grapefruit weights more than 1.25 pounds?
- A. 0.0188
 - B. 0.0156
 - C. 0.3156
 - D. 0.4013
 - E. 0.5987
- ___ 32. Use Scenario 6-9. What is the probability that the total weight of three randomly selected grapefruits is more than 3.4 pounds?
- A. nearly 0
 - B. 0.0274
 - C. 0.1335
 - D. 0.2514
 - E. 0.2611

Scenario 6-10

Your friend Albert has invented a game involving two ten-sided dice. One of the dice has threes, fours, and fives on its faces, the other has sixes, eights, and tens. He won't tell you how many of each number there are on the faces, but he does tell you that if X = rolls of the first die and Y = rolls of the second die, then $\mu_X = 3.6$, $\sigma_X = 0.8$, $\mu_Y = 8.0$, and $\sigma_Y = 0.9$. Let Z = the sum of the two dice when each is rolled once.

- ___ 33. Use Scenario 6-10. What is the expected value of Z ?
- A. 1.7
 - B. 4.4
 - C. 8.8
 - D. 8.9
 - E. 11.6
- ___ 34. Use Scenario 6-10. What is the standard deviation of Z ?
- A. 1.20
 - B. 1.30
 - C. 1.45
 - D. 1.70
 - E. 2.89

- _____ 35. Use Scenario 6-10. Here's Albert's game: You give him \$10 each time you roll, and he pays you (in dollars) the amount that comes up on the dice. If P = the amount of money you gain each time you roll, the mean and standard deviation of P are:
- A. $\mu_P = -1.6; \sigma_P = 1.45$
 - B. $\mu_P = 1.6; \sigma_P = 1.45$
 - C. $\mu_P = 1.6; \sigma_P = 1.2$
 - D. $\mu_P = -1.6; \sigma_P = -13.8$
 - E. $\mu_P = 1.6; \sigma_P = 13.8$
- _____ 36. "Insert tab A into slot B" is something you might read in the assembly instructions for pre-fabricated bookshelves. Suppose that tab A varies in size according to a Normal distribution with a mean of 30 mm. and a standard deviation of 0.5 mm., and the size of slot B is also Normally distributed, with a mean of 32 mm. and a standard deviation of 0.8 mm. The two parts are randomly and independently selected for packaging. What is the probability that tab A won't fit into slot B?
- A. 0.0007
 - B. 0.0170
 - C. 0.0618
 - D. 0.9382
 - E. 0.9830

Scenario 6-11

The mp3 music files on Sharon's computer have a mean size of 4.0 megabytes and a standard deviation of 1.8 megabytes. She wants to create a mix of 10 of the songs for a friend. Let the random variable T = the total size (in megabytes) for 10 randomly selected songs from Sharon's computer.

- _____ 37. Use Scenario 6-11. What is the expected value of T ?
- A. 4.0
 - B. 7.2
 - C. 10.0
 - D. 40.0
 - E. 180.0
- _____ 38. Use Scenario 6-11. What is the standard deviation of T ? (Assume the lengths of songs are independent.)
- A. 1.80
 - B. 3.24
 - C. 5.69
 - D. 18.00
 - E. 32.40
- _____ 39. Use Scenario 6-11. Typically, the formula $1.07(\text{file size}) - 0.02$ provides a good estimate of the length of a song in minutes. If $M = 1.07T - 0.02$, what are the mean and standard deviation of M ?
- A. $\mu_M = 42.78; \sigma_M = 5.80$
 - B. $\mu_M = 42.78; \sigma_M = 6.09$
 - C. $\mu_M = 42.8; \sigma_M = 5.80$
 - D. $\mu_M = 42.8; \sigma_M = 6.07$
 - E. $\mu_M = 42.8; \sigma_M = 6.07$

- _____ 40. Sulé’s job is just a few bus stops away from his house. While it can be faster to take the bus to work, it’s more variable, because of variations in traffic. He estimates that the commute time to work by bus is approximately Normally distributed with a mean of 12 minutes and a standard deviation of 4 minutes. The commute time if he walks to work is also approximately Normally distributed with a mean of 16 minutes with a standard deviation of 1 minute. What is the probability that the bus will be faster than walking?
- A. 0.8340
 - B. 0.8485
 - C. 0.8980
 - D. 0.9756
 - E. 0.9896
- _____ 41. An airplane has a front and a rear door that are both opened to allow passengers to exit when the plane lands. The plane has 100 passengers seated. The number of passengers exiting through the front door should have
- A. a binomial distribution with mean 50.
 - B. a binomial distribution with 100 trials but success probability not equal to 0.5.
 - C. a geometric distribution with $p = 0.5$.
 - D. a normal distribution with a standard deviation of 5.
 - E. none of the above.
- _____ 42. A small class has 10 students. Five of the students are male and five are female. I write the name of each student on a 3-by-5 card. The cards are shuffled thoroughly and I draw cards, one at a time, until I get a card with the name of a male student. Let X be the number of cards I draw. The random variable X has which of the following probability distributions?
- A. A binomial distribution with mean 5.
 - B. A binomial distribution with mean 10.
 - C. The geometric distribution with probability of success 0.1.
 - D. The geometric distribution with probability of success 0.5.
 - E. None of the above.
- _____ 43. For which of the following counts would a binomial probability model be reasonable?
- A. The number of traffic tickets written by each police officer in a large city during one month.
 - B. The number of hearts in a hand of five cards dealt from a standard deck of 52 cards that has been thoroughly shuffled.
 - C. The number of 7’s in a randomly selected set of five random digits from a table of random digits.
 - D. The number of phone calls received in a one-hour period.
 - E. All of the above.
- _____ 44. To pass the time, a toll booth collector counts the number of cars that pass through his booth until he encounters a driver with red hair. Suppose we define the random variable Y = the number of cars the collector counts until he gets a red-headed driver for the first time. Is Y a geometric random variable?
- A. Yes – all conditions for the geometric setting are met.
 - B. No – “red-headed driver” and “non-red-headed driver” are not the same as “success” and “failure”.
 - C. No – we can’t assume that each “trial” (that is, each car) is independent of previous trials.
 - D. No – the number of trials is not fixed.
 - E. No – the probability of a driver being red-headed is not the same for each trial.

Scenario 6-12

There are twenty multiple-choice questions on an exam, each having responses a, b, c, or d. Each question is worth five points and only one option per question is correct. Suppose the student *guesses* the answer to each question, and the guesses from question to question are independent.

- ___ 45. Use Scenario 6-12. The distribution of X = the number of questions the student will get correct, is
- A. binomial with parameters $n = 5$ and $p = 0.2$.
 - B. binomial with parameters $n = 20$ and $p = 0.25$.
 - C. binomial with parameters $n = 5$ and $p = 0.25$.
 - D. binomial with parameters $n = 4$ and $p = 0.25$.
 - E. none of these.
- ___ 46. Use Scenario 6-12. Which of the following expresses the probability that the student gets no questions correct?
- A. $(0.25)^{20}$
 - B. $(0.75)^{20}$
 - C. $\binom{20}{1}(0.25)(0.75)^{19}$
 - D. $\binom{5}{1}(0.25)(0.75)^4$
 - E. $\binom{5}{1}(0.25)^4(0.75)$
- ___ 47. In a certain game of chance, your chances of winning are 0.2. If you play the game five times and outcomes are independent, which of the following represents the probability that you win at least once?
- A. $(0.2)^5$
 - B. $1 - (0.2)^5$
 - C. $1 - (0.8)^5$
 - D. $\binom{5}{1}(0.2)(0.8)^4$
 - E. $(0.8)^5 + \binom{5}{1}(0.2)(0.8)^4$

Scenario 6-13

A survey asks a random sample of 1500 adults in Ohio if they support an increase in the state sales tax from 5% to 6%, with the additional revenue going to education. Let X denote the number in the sample that say they support the increase. Suppose that 40% of *all* adults in Ohio support the increase.

- ___ 48. Use Scenario 6-13. Which of the following is the mean μ of X ?
- A. 5%
 - B. 360
 - C. 0.40
 - D. 600
 - E. 90

- ___ 49. Use Scenario 6-13. Which of the following is the approximate standard deviation σ of X ?
- A. 0.40
 - B. 0.24
 - C. 19
 - D. 360
 - E. 9.20

Scenario 6-14

A worn out bottling machine does not properly apply caps to 5% of the bottles it fills.

- ___ 50. Use Scenario 6-14. If you randomly select 20 bottles from those produced by this machine, what is the approximate probability that exactly 2 caps have been improperly applied?
- A. 0.0002
 - B. 0.19
 - C. 0.74
 - D. 0.81
 - E. 0.92
- ___ 51. Use Scenario 6-14. If you randomly select 20 bottles from those produced by this machine, what is the approximate probability that between 2 and 6 (inclusive) caps have been improperly applied?
- A. 0.19
 - B. 0.26
 - C. 0.38
 - D. 0.74
 - E. 0.92
- ___ 52. Use Scenario 6-14. In a production run of 800 bottles, what is the expected value for the number of bottles with improperly applied caps?
- A. 4
 - B. 8
 - C. 40
 - D. 50
 - E. 80
- ___ 53. Use Scenario 6-14. In a production run of 800 bottles, what is the standard deviation for the number of bottles with improperly applied caps?
- A. 1.38
 - B. 6.16
 - C. 6.32
 - D. 6.89
 - E. 8.72
- ___ 54. A college basketball player makes 80% of her free throws. At the end of a game, her team is losing by two points. She is fouled attempting a three-point shot and is awarded three free throws. Assuming free throw attempts are independent, what is the probability that she makes at least two of the free throws?
- A. 0.896.
 - B. 0.80.
 - C. 0.64.
 - D. 0.512.
 - E. 0.384.

- ___ 55. A college basketball player makes $\frac{5}{6}$ of his free throws. Assuming free throw attempts are independent, the probability that he makes exactly three of his next four free throws is
- $4\left(\frac{1}{6}\right)^3\left(\frac{5}{6}\right)^1$.
 - $\left(\frac{1}{6}\right)^3\left(\frac{5}{6}\right)^1$.
 - $3\left(\frac{1}{6}\right)^1\left(\frac{5}{6}\right)^3$.
 - $\left(\frac{1}{6}\right)^1\left(\frac{5}{6}\right)^3$.
 - $4\left(\frac{1}{6}\right)^1\left(\frac{5}{6}\right)^3$.
- ___ 56. Roll one 8-sided die 10 times. The probability of getting exactly 3 sevens in those 10 rolls is given by
- $\binom{10}{3} \cdot \left(\frac{1}{8}\right)^3 \cdot \left(\frac{7}{8}\right)^5$
 - $\binom{10}{3} \cdot \left(\frac{1}{8}\right)^3 \cdot \left(\frac{7}{8}\right)^7$
 - $\binom{8}{3} \cdot \left(\frac{1}{8}\right)^3 \cdot \left(\frac{7}{8}\right)^5$
 - $\binom{8}{3} \cdot \left(\frac{1}{8}\right)^3 \cdot \left(\frac{7}{8}\right)^7$
 - $\binom{10}{3} \cdot \left(\frac{7}{8}\right)^3 \cdot \left(\frac{1}{8}\right)^7$
- ___ 57. The binomial expression ${}_8C_2 \cdot \left(\frac{1}{3}\right)^2 \cdot \left(\frac{2}{3}\right)^6$ gives the probability of
- at least 2 successes in 8 trials if the probability of success in one trial is $\frac{1}{3}$.
 - at least 2 successes in 8 trials if the probability of success in one trial is $\frac{2}{3}$.
 - exactly 2 successes in 8 trials if the probability of success in one trial is $\frac{1}{3}$.
 - exactly 2 successes in 8 trials if the probability of success in one trial is $\frac{2}{3}$.
 - at least 6 successes in 8 trials if the probability of success in one trial is $\frac{2}{3}$.
- ___ 58. A college basketball player makes 80% of her free throws. Suppose this probability is the same for each free throw she attempts, and free throw attempts are independent. The probability that she makes all of her first four free throws and then misses her fifth attempt this season is
- 0.32768.
 - 0.08192.
 - 0.06554.
 - 0.00128.
 - 0.00032.

- ___ 59. A college basketball player makes 80% of her free throws. Suppose this probability is the same for each free throw she attempts, and free throw attempts are independent. The expected number of free throws required until she makes her first free throw of the season is
- A. 2.
 - B. 1.25.
 - C. 0.80.
 - D. 0.31.
 - E. 0.13

Scenario 6-15

Suppose that 40% of the cars in a certain town are white. A person stands at an intersection waiting for a white car. Let X = the number of cars that must drive by until a white one drives by.

- ___ 60. Use Scenario 6-15. $P(X < 5) =$
- A. 0.0518
 - B. 0.1296
 - C. 0.2592
 - D. 0.8704
 - E. 0.9482
- ___ 61. Use Scenario 6-15. The expected value of X is:
- A. 1
 - B. 1.5
 - C. 2
 - D. 2.5
 - E. 3

Scenario 6-16

A poll shows that 60% of the adults in a large town are registered Democrats. A newspaper reporter wants to interview a local democrat regarding a recent decision by the City Council.

- ___ 62. Use Scenario 6-16. If the reporter asks adults on the street at random, what is the probability that he will find a Democrat by the time he has stopped three people?
- A. 0.936
 - B. 0.216
 - C. 0.144
 - D. 0.096
 - E. 0.064
- ___ 63. Use Scenario 6-16. On average, how many people will the reporter have to stop before he finds his first Democrat?
- A. 1
 - B. 1.33
 - C. 1.67
 - D. 2
 - E. 2.33

Scenario 6-17

You are stuck at the Vince Lombardi rest stop on the New Jersey Turnpike with a dead battery. To get on the road again, you need to find someone with jumper cables that connect the batteries of two cars together so you can start your car again. Suppose that 16% of drivers in New Jersey carry jumper cables in their trunk. You begin to ask random people getting out of their cars if they have jumper cables.

- ___ 64. Use Scenario 6-17. On average, how many people do you expect you will have to ask before you find someone with jumper cables?
- A. 1.6
 - B. 2
 - C. 6
 - D. 6.25
 - E. 16
- ___ 65. Use Scenario 6-17. You're going to give up and call a tow truck if you don't find jumper cables by the time you've asked 10 people. What's the probability you end up calling a tow truck?
- A. 0.8251
 - B. 0.1749
 - C. 0.1344
 - D. 0.0333
 - E. 0.0280
- ___ 66. At a school with 600 students, 25% of them walk to school each day. If we choose a random sample of 40 students from the school, is it appropriate to model the number of students in our sample who walk to school with a binomial distribution where $n = 40$ and $p = 0.25$?
- A. No, the appropriate model is a geometric distribution with $n = 40$ and $p = 0.25$.
 - B. No, it is never appropriate to use a binomial setting when we are sampling without replacement.
 - C. Yes, because the sample size is less than 10% of the population size.
 - D. Yes, because $0.2 \leq p \leq 0.8$ and $n < 30$.
 - E. We can't determine whether a binomial distribution is appropriate unless the number of trials is known.
- ___ 67. A jar has 250 marbles in it, 40 of which are red. What is the largest sample size we can take from the jar (without replacement) if we want to use the binomial distribution to model the number of red marbles in our sample?
- A. 50
 - B. 40
 - C. 25
 - D. 4
 - E. You can't use a binomial distribution in this setting.

AP Stats Random Variables Review Answer Section

MULTIPLE CHOICE

- | | | |
|------------|--------|--|
| 1. ANS: D | PTS: 1 | TOP: Continuous vs. Discrete random variables |
| 2. ANS: A | PTS: 1 | TOP: Continuous vs. Discrete random variables |
| 3. ANS: A | PTS: 1 | TOP: Idea of random variable |
| 4. ANS: D | PTS: 1 | TOP: Identifying random variables |
| 5. ANS: B | PTS: 1 | TOP: Identifying random variables |
| 6. ANS: D | PTS: 1 | TOP: Idea of random variable |
| 7. ANS: E | PTS: 1 | TOP: Idea of random variable |
| 8. ANS: C | PTS: 1 | TOP: Discrete random variables: probabilities from tables |
| 9. ANS: B | PTS: 1 | TOP: Discrete random variables: probabilities from tables |
| 10. ANS: D | PTS: 1 | TOP: Discrete random variables: probabilities from tables |
| 11. ANS: B | PTS: 1 | TOP: Discrete random variables: probabilities from tables |
| 12. ANS: D | PTS: 1 | TOP: Discrete random variables: probabilities from tables |
| 13. ANS: B | PTS: 1 | TOP: Mean of Discrete Random Variable |
| 14. ANS: C | PTS: 1 | TOP: Standard deviation of Discrete R.V. |
| 15. ANS: B | PTS: 1 | TOP: Mean of Discrete Random Variable |
| 16. ANS: C | PTS: 1 | TOP: Standard deviation of Discrete R.V. |
| 17. ANS: B | PTS: 1 | TOP: Discrete random variables: probabilities from tables |
| 18. ANS: C | PTS: 1 | TOP: Mean of Discrete Random Variable |
| 19. ANS: D | PTS: 1 | TOP: Mean of Discrete Random Variable |
| 20. ANS: B | PTS: 1 | TOP: Standard deviation or variance of Discrete R.V. |
| 21. ANS: C | PTS: 1 | TOP: Mean of Discrete Random Variable |
| 22. ANS: E | PTS: 1 | TOP: Idea of a density curve |
| 23. ANS: C | PTS: 1 | TOP: Continuous rand. vars.: probabilities from density curves |
| 24. ANS: B | PTS: 1 | TOP: Continuous rand. vars.: probabilities from density curves |
| 25. ANS: A | PTS: 1 | TOP: Continuous rand. vars.: probabilities from density curves |
| 26. ANS: C | PTS: 1 | TOP: Continuous rand. vars.: probabilities from density curves |
| 27. ANS: E | PTS: 1 | TOP: Continuous rand. vars.: probabilities from density curves |
| 28. ANS: A | PTS: 1 | TOP: Normal random variable probability |
| 29. ANS: D | PTS: 1 | TOP: Normal random variable probability |
| 30. ANS: D | PTS: 1 | TOP: Normal random variable probability |
| 31. ANS: A | PTS: 1 | TOP: Normal random variable probability |
| 32. ANS: B | PTS: 1 | TOP: Combining normal random variables |
| 33. ANS: E | PTS: 1 | TOP: Mean of sum of random variables |
| 34. ANS: A | PTS: 1 | TOP: Std. dev. of sum of random variables |
| 35. ANS: C | PTS: 1 | TOP: Linear transformation of random variable |
| 36. ANS: B | PTS: 1 | TOP: Combining normal random variables |
| 37. ANS: D | PTS: 1 | TOP: Mean of sum of random variables |
| 38. ANS: C | PTS: 1 | TOP: Std. dev. of sum of random variables |
| 39. ANS: B | PTS: 1 | TOP: Linear transformation of random variable |
| 40. ANS: A | PTS: 1 | TOP: Combining normal random variables |
| 41. ANS: E | PTS: 1 | TOP: Binomial/Geometric setting |

42.	ANS: E	PTS: 1	TOP: Binomial/Geometric setting
43.	ANS: C	PTS: 1	TOP: Binomial setting
44.	ANS: A	PTS: 1	TOP: Geometric setting
45.	ANS: B	PTS: 1	TOP: Binomial setting
46.	ANS: B	PTS: 1	TOP: Binomial probability
47.	ANS: C	PTS: 1	TOP: Binomial probability
48.	ANS: D	PTS: 1	TOP: Binomial mean
49.	ANS: C	PTS: 1	TOP: Binomial standard deviation
50.	ANS: B	PTS: 1	TOP: Binomial probability
51.	ANS: B	PTS: 1	TOP: Binomial probability
52.	ANS: C	PTS: 1	TOP: Binomial mean
53.	ANS: B	PTS: 1	TOP: Binomial standard deviation
54.	ANS: A	PTS: 1	TOP: Binomial probability
55.	ANS: E	PTS: 1	TOP: Binomial probability
56.	ANS: B	PTS: 1	TOP: Binomial probability
57.	ANS: C	PTS: 1	TOP: Binomial probability
58.	ANS: B	PTS: 1	TOP: Geometric probability
59.	ANS: B	PTS: 1	TOP: Geometric mean
60.	ANS: D	PTS: 1	TOP: Geometric probability
61.	ANS: D	PTS: 1	TOP: Geometric mean
62.	ANS: A	PTS: 1	TOP: Geometric probability
63.	ANS: C	PTS: 1	TOP: Geometric mean
64.	ANS: D	PTS: 1	TOP: Geometric probability
65.	ANS: B	PTS: 1	TOP: Geometric mean
66.	ANS: C	PTS: 1	TOP: Binomial setting and sampling
67.	ANS: C	PTS: 1	TOP: Binomial setting and sampling