

**Provide an appropriate response.**

- 1) Which of the random variables described below is/are discrete random variables?

The random variable  $X$  represents the number of heads when a coin is flipped 20 times.

The random variable  $Y$  represents the number of calls received by a car tow service in a year.

The random variable  $Z$  represents the weight of a randomly selected student.

**Determine whether the given procedure results in a binomial distribution. If not, state the reason why.**

- 2) Rolling a single die 59 times, keeping track of the numbers that are rolled.
- 3) Rolling a single die 39 times, keeping track of the "fives" rolled.

**Determine whether the following is a probability distribution. If not, identify the requirement that is not satisfied.**

4)

$x$	$P(x)$
1	0.037
2	0.200
3	0.444
4	0.296

**Determine the possible values of the random variable.**

- 5) For a randomly selected student in a particular high school, let  $Y$  denote the number of living grandparents of the student. What are the possible values of the random variable  $Y$ ?

**Find the mean and the standard deviation of the given probability distribution.**

- 6) The number of golf balls ordered by customers of a pro shop has the following probability distribution.

$x$	3	6	9	12	15
$p(x)$	0.14	0.29	0.36	0.11	0.10

**Find the indicated probability.**

- 7) A question on a proficiency test is multiple choice with four possible answers, one of which is correct. Assuming that all responses are random guesses, find the probability that among 12 test subjects, exactly five answer the question correctly.
- 8) What is the probability that 6 rolls of a fair die will show exactly three fives?
- 9) A test consists of 10 true / false questions. To pass the test a student must answer at least 6 questions correctly. If a student guesses on each question, what is the probability that the student will pass the test?
- 10) In one city, the probability that a person will pass his or her driving test on the first attempt is 0.65. 11 people are selected at random from among those taking their driving test for the first time. What is the probability that among these 11 people, the number passing the test is between 2 and 4 inclusive?

**Answer the question.**

- 11) Suppose that voting in municipal elections is being studied and that the accompanying table describes the probability distribution for four randomly selected people, where  $x$  is the number that voted in the last election. Is it unusual to find four voters among four randomly selected people?

- a) Use the probability rule.  
b) Use the range rule of thumb rule.

$x$	$P(x)$
0	0.23
1	0.32
2	0.26
3	0.15
4	0.04

- 12) Focus groups of 13 people are randomly selected to discuss products of the Yummy Company. It is determined that the mean number (per group) who recognize the Yummy brand name is 10.3, and the standard deviation is 0.73. Would it be unusual to randomly select 13 people and find that fewer than 7 recognize the Yummy brand name?

**Determine if the outcome is unusual. Consider as unusual any result that differs from the mean by more than 2 standard deviations. That is, unusual values are either less than  $\mu - 2\sigma$  or greater than  $\mu + 2\sigma$ .**

- 13) A survey for brand recognition is done and it is determined that 68% of consumers have heard of Dull Computer Company. A survey of 800 randomly selected consumers is to be conducted. For such groups of 800, would it be unusual to get 664 consumers who recognize the Dull Computer Company name?
- 14) According to AccuData Media Research, 36% of televisions within the Chicago city limits are tuned to "Eyewitness News" at 5:00 pm on Sunday nights. At 5:00 pm on a given Sunday, 2500 such televisions are randomly selected and checked to determine what is being watched. Would it be unusual to find that 824 of the 2500 televisions are tuned to "Eyewitness News"? What might you conclude from that result?

**Solve the problem.**

- 15) A die is rolled 19 times and the number of twos that come up is tallied. If this experiment is repeated many times, find the mean and the standard deviation for the number of twos rolled. Is it unusual to obtain three twos?
- 16) According to a college survey, 22% of all students work full time. Find the mean for the number of students who work full time in samples of size 16.
- 17) In a certain town, 40% of adults have a college degree. The accompanying table describes the probability distribution for the number of adults (among 4 randomly selected adults) who have a college degree. Find the mean and the standard deviation for the probability distribution.

$x$	$P(x)$
0	0.1296
1	0.3456
2	0.3456
3	0.1536
4	0.0256

- 18) In a certain college, 33% of the physics majors belong to ethnic minorities. If 10 students are selected at random from the physics majors, what is the probability that exactly 2 belong to an ethnic minority?

## Answer Key

### Testname: CHAPTER5

- 1) X and Y
- 2) Not binomial: there are more than two outcomes for each trial.
- 3) Procedure results in a binomial distribution.
- 4) Not a probability distribution. The sum of the P(x)'s is not 1.
- 5) 0, 1, 2, 3, 4
- 6) 8.22, 3.411
- 7) 0.103
- 8) 0.0536
- 9) 0.377
- 10) 0.0499
- 11) Yes
- 12) Yes
- 13) Yes
- 14) Yes, because it is more than two standard deviations lower than the mean.  
This may imply that the percentage of televisions within the Chicago city limits which are tuned to "Eyewitness News" at 5:00 pm on Sunday nights is probably lower than 36%.
- 15) 3.16, 1.624, not unusual because it is within two standard deviations from the mean.
- 16) 3.52
- 17) 1.6, 0.98
- 18) A success is that a person belongs to an ethnic minority.  
 $p = 0.33$   
 $n = 10$   
$$P(X = 2) = \binom{10}{2} (0.33)^2 (0.67)^8 = 0.1990$$