**Vocabulary (Matching)**

Random, Probability, Simulation, Probability Model, Sample Space, Event, Complement of an event, Mutually exclusive events, Conditional probability, Independent events, Symbols “AND”, “OR” problems

**Multiple Choice/Short Answer Type Questions**

1. A calculator is programmed to generate random whole numbers between 1 and 15 inclusive. If one number is randomly selected, what is the probability that it is odd?

 2. a. What is the probability of an event that is known to be impossible?

 b. What is the probability of an event that will definitely occur?

 c. What is P(AC) if P(A) = 0.59?

 3. A survey is made in a neighborhood that consists of 60 Democrats and 40 Republicans. Of the Democrats, 35 are women, while 15 of the Republicans are women. If one person from this group is randomly selected, find the probability of getting each outcome:



 a. Make a two-way table for this information,labeling columns and rows.

 b. If one person from this group is randomly selected, find the probability of getting a male or a Democrat?

 c. If one person from this group is randomly selected, find the probability of getting a male Democrat?

 d. If one person from this group has been randomly selected and we are given that the person

 is a female, what is the probability that the person is a Republican?

 4. Eight men and seven women have applied for a temporary job. If three different applicants are randomly selected from this group, find the probability that all three are women.

 5. If a couple plans to have four children, find the probability that they are all of the same sex. Assume that boys and girls are equally likely and that births are independent.

6. If a day of the week and a month of the year are each randomly selected, what is the probability of picking Friday and February?

7. Previous studies have shown that a particular treatment has a 60% cure rate. The treatment is used on 6 different patients.

 a. What is the probability that all 6 are cured?

 b. What is the probability that no one is cured?

8. A box contains 12 batteries, 3 of which are defective. If two batteries are chosen at random, find the probability that they are both defective if:

 a. the first selection is replaced before the second selection is made.

 b. the first selection is not replaced before the second selection is made.

9. Sixty-two percent of TCW students take both math and science. 85% of the students take math.

 a. Draw a Venn diagram

 b. P(student takes science, given that he or she takes math)

10. Eight-five percent of TCW students take math and 72% take science. 62% of the students take both math and science.

 a. Draw a Venn diagram

 b. P(student takes math or science)

11. In 60 patients given a vaccine, 35 unfavorable reactions occurred. If the records of two different patients are randomly selected, find the probability that they both had unfavorable reactions.

12. Suppose we have a group of 12 men (M) and 8 women (F). Eight of the men are registered Republican (R) and 3 of the women are registered Republican. (Use D for Democrat “not Republican”).

 a. Label and complete a two-way table

13. Determine whether the two events are mutually exclusive:

 a. selecting a day in October, selecting Halloween Day

 b. selecting a king from a 52-card deck; selecting a diamond from a 52-card deck

14. If P(A) = 0.436, then what is P(AC)?

15. A four-question true/false quiz is given. If event A is “getting all four questions correct”, write its complement in words.

16. A citizens’ action committee for national health care consists of 6 Democrats, 1 Republican and

 3 Independents. Find the probability of getting each of the following if random selections are made:

 a. an Independent, if one member is selected

 b. a Republican or an Independent, if one member is selected

 c. two Democrats, if two different people are selected

17. The two-way table at the right categorizes students by gender and grade level. If one student is randomly selected, find the probability of:

 a. getting a female

 b. getting a male or a junior

 c. getting a junior or a senior

 d. getting a female sophomore

 e. getting a female, given that the student is a junior

 f. getting a sophomore, given that the student is male

18. An unprepared student makes random guesses for the eight true/false questions on a quiz.

 a. What is the probability that he gets at least one correct answer.

 b. What is the probability the answers are all correct or all wrong?

19. A quiz consists 5 multiple choice questions. Each question has 4 choices. You choose answers at random

 a. P(getting all 5 answers correct)

 b. P(getting 2 of the 5 answers correct)

20. A box contains 12 batteries, 9 are working and 3 are defective. If you randomly select 2 batteries, what is the probability that one works and one is defective?

21. Four kings and three aces are mixed and then drawn one at a time at random. Three cards are drawn. Find the probability that all three cards drawn are aces if:

 a. each card is replaced before the next draw ……………

 b. the card is not replaced before the next draw ……………

22. A statistics class contains six males and eight females. Three of the females are psychology majors, while the remaining females are sociology majors. Five of the males are psychology majors, while the other male is a sociology major.

 a. Fill in the Venn Diagram

 b. Find the probability of selecting one student at random who is female or a sociology major.

 c. Given that the student is a psychology major, find the probability that the student is male.

 d. Describe what the shaded region represents in terms of “Females”

 and “Sociology”.

23. A certain test for the HIV has a 20% false positive rate and a 5% false negative rate. For Washington, DC, 5% of all adults have HIV. Because screening can be expensive, this particular test is used first because it is cheaper. Find the probability that a person who tests positive actually has HIV? (Hint: Draw a tree diagram.)