Time Frame: 50 minutes

Subject Matter: The Addition Rules of Probability

**TELL ME**

Anticipatory Set:

Determine if the following events can happen at the same time or not when one card is drawn from an ordinary deck of cards.

1. Getting a queen and a king.
2. Getting an ace and heart.
3. Getting a 7 and getting a jack.
4. Getting a face card and getting a spade.

Objective: TSWBAT find the probability of an event using the addition rules for probability.

Standards: DA – 1.1, 1.2, & 1.5

Materials: Textbook, O.H.P. & Transparencies

**SHOW ME**

Presentation of Information:

Definition of Terms:

* **Mutually Exclusive**

Two events are mutually exclusive if they cannot occur at the same time. (i.e., getting a queen and a king)

**Example 1**: Determine which events are mutually exclusive and which are not when a single die is rolled.

1. Getting an odd number and getting an even number.
2. Getting a 3 and getting an odd number.
3. Getting an odd number and getting a number less than 4.
4. Getting a number greater than 4 and getting a number less than 4.

* **Addition Rule # 1**

When two events A and B are mutually exclusive, the probability that A **or** B will occur is

***P(A or B) = P(A) + P(B)***

**Example 2:** A box contains 3 glazed doughnuts, 4 jelly doughnuts, and 5 chocolate doughnuts. If a person selects one doughnut at random, find the probability that it is either a glazed doughnut or a chocolate doughnut.

**Example 3:** A day of the week is selected at random. Find the probability that it is a weekend day.

* **Addition Rule # 2**

When two events A and B are not mutually exclusive, then

***P(A or B) = P(A) + P(B) – P(A and B)***

**Example 4:** A single card is drawn from a deck. Find the probability that it is a king or a club.

**Example 5:**  In a hospital unit, there are 8 nurses and 5 physicians; 7 nurses and 3 physicians are females. If a staff person is selected, find the probability that the person is a nurse or a male.

Solution:

The sample space is shown here.

|  |  |  |  |
| --- | --- | --- | --- |
| Staff | Females | Males | Total |
| Nurses | 7 | 1 | 8 |
| Physicians | 3 | 2 | 5 |
| Total | 10 | 3 | 13 |

The probability is ***P(nurse or male) = P(nurse) + P(male) – P(male nurse)***

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**LET ME TRY**

1. Determine whether these events are mutually exclusive.
   1. Roll a die: Get an even number, and get a number less than 3.
   2. Roll a die: get a prime number (2, 3, 5), and get an odd number.
   3. Roll a die: Get a number greater than 3, and get a number less than 3.
2. A furniture store decides to select a month for its annual sale. Find the probability that it will be April or May. Assume that all months have an equal probability of being selected.
3. In a large department store, there are 2 managers, 4 department heads, 16 clerks, and 4 stock persons. If a person is selected at random, find the probability that the person is either a clerk or a manager.
4. At a convention there are 7 mathematics instructors, 5 computer science instructors, 3 statistics instructors, and 4 science instructors. If an instructor is selected, find the probability of getting a science instructor or a math instructor.
5. An automobile dealer has 10 Fords, 7 Buicks, and 5 Chevrolets on her used-car lot. If a person purchases a used car, find the probability that it is a Ford or a Buick.
6. On a small college campus, there are 5 English professors, 4 Mathematics professors, 2 Science professors, 3 Psychology professors, and 3 History professors. If a professor is selected at random, find the probability that the professor is the following:
   1. An English or a Psychology professor.
   2. A Mathematics or Science professor.
   3. A History, Science, or Mathematics professor.
   4. An English, Mathematics, or History professor.
7. At a particular school with 200 male students, 58 play football, 40 play basketball, and 8 play both. What is the probability that a randomly selected male student plays neither sport?
8. A single card is drawn from a deck. Find the probability of selecting the following:
   1. A 4 or a diamond.
   2. A club or a diamond.
   3. A jack or a black card.