Time Frame: 50 minutes

Subject Matter: The Addition Rules of Probability

**TELL ME**

Anticipatory Set:

Determine if the following events are mutually exclusive 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)

* **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)***

* **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 1**: Determine which events are mutually exclusive and which are not when a single die is rolled. Then find the probability of each event.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| Getting an odd number and getting an even number. |  |  |  |  |
| Getting a 3 and getting an odd number. |  |  |  |  |
| Getting an odd number and getting a number less than 4. |  |  |  |  |
| Getting a number greater than 4 and getting a number less than 4. |  |  |  |  |

**Example 2:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| 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:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| A day of the week is selected at random. Find the probability that it is a weekend day. |  |  |  |  |

**Example 4:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| A single card is drawn from a deck. Find the probability that it is a king or a club. |  |  |  |  |

**Example 5:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| 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 | |  |  |  |  |

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

**LET ME TRY**

1. Determine whether these events are mutually exclusive. Find the probability of each event.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| Roll a die: Get an even number, and get a number less than 3. |  |  |  |  |
| Roll a die: get a prime number (2, 3, 5), and get an odd number. |  |  |  |  |
| Roll a die: Get a number greater than 3, and get a number less than 3. |  |  |  |  |
| Draw a card from a deck: Get a 4 or a diamond. |  |  |  |  |
| Draw a card from a deck: Get a club or a diamond. |  |  |  |  |
| Draw a card from a deck: Get a jack or a black card. |  |  |  |  |

1. Solve the problem.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| The probability that a student owns a car is 0.65, and the probability that a student owns a computer is 0.82. If the probability that a student owns both is 0.55, what is the probability that a given student owns neither a car nor a computer? |  |  |  |  |

1. In a statistics class there are 18 juniors and 10 seniors; 6 of the seniors are females, and 12 of the juniors are males. If a student is selected at random, find the probability of selecting the following:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| A junior or a female |  |  |  |  |
| A senior or a female |  |  |  |  |
| A junior or a senior |  |  |  |  |