Time Frame: 50 minutes

Subject Matter: The Addition Rules of Probability

**TELL ME**

Anticipatory Set:

A sales representative who visits customers at home finds she sells 0, 1, 2, 3, or 4 items according to the following frequency distribution.

|  |  |
| --- | --- |
| Items sold | Frequency |
| 0 | 8 |
| 1 | 10 |
| 2 | 3 |
| 3 | 2 |
| 4 | 1 |

Find the probability that she sells the following.

1. Exactly one item.
2. More than 2 items.
3. At least 1 item.
4. At most 3 items
5. At most 1 item

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:

* **Addition Rule # 1**

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

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

* **Addition Rule # 2**

When three events A, B, and C are not mutually exclusive, then

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

**Example 1:** A recent study of 300 patients found that of 100 alcoholic patients, 87 had elevated cholesterol levels, and 200 nonalcoholic patients, 43 had elevated cholesterol levels.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Elevated Cholesterol Level** | **Normal Cholesterol Level** | **Total** |
| **Alcoholic Patient** |  |  |  |
| **Nonalcoholic Patient** |  |  |  |
| **Total** |  |  |  |

If a patient is selected at random, find the probability that the patient is the following.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| An alcoholic with elevated cholesterol level. |  |  |  |  |
| A nonalcoholic or has a normal cholesterol level. |  |  |  |  |
| An alcoholic or with elevated cholesterol level. |  |  |  |  |
| A nonalcoholic with a normal cholesterol level. |  |  |  |  |
| A nonalcoholic. |  |  |  |  |

**Example 2:** If one card is drawn from an ordinary deck of cards, find the probability of getting the following.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| A king or a queen or a jack. |  |  |  |  |
| A club or a jack, or a spade. |  |  |  |  |
| A king or a Queen or a diamond. |  |  |  |  |
| An ace or a diamond or a heart. |  |  |  |  |
| A 9 or a 10 or a spade or a club. |  |  |  |  |

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

**LET ME TRY**

1. A recent study of 500 patients found that of 300 alcoholic patients, 215 had elevated cholesterol levels, and 200 nonalcoholic patients, 65 had elevated cholesterol levels.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Elevated Cholesterol Level** | **Normal Cholesterol Level** | **Total** |
| **Alcoholic Patient** |  |  |  |
| **Nonalcoholic Patient** |  |  |  |
| **Total** |  |  |  |

If a patient is selected at random, find the probability that the patient is the following.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| An alcoholic with normal cholesterol level. |  |  |  |  |
| An alcoholic or has a normal cholesterol level. |  |  |  |  |
| A nonalcoholic or with elevated cholesterol level. |  |  |  |  |
| An alcoholic or with an elevated cholesterol level. |  |  |  |  |
| An alcoholic. |  |  |  |  |

1. If one card is drawn from an ordinary deck of cards, find the probability of getting the following.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| An ace or 2 or a 10 |  |  |  |  |
| A heart or a queen, or a spade. |  |  |  |  |
| A king or a Heart or a diamond. |  |  |  |  |
| An ace or a diamond or a jack. |  |  |  |  |
| A 7 or a 10 or a queen or a spade. |  |  |  |  |

Homework:

Two dice are rolled. Find the probability of getting;

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| A sum of 6 or 7 or 8. |  |  |  |  |
| Doubles or a sum of 4 or 6. |  |  |  |  |
| A sum greater than 9 or less than 4 or a 7 |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Die 2 | | | | | |
| Die 1 | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |

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

**LET ME TRY**

1. A recent study of 800 patients found that of 500 alcoholic patients, 325 had elevated cholesterol levels, and 300 nonalcoholic patients, 90 had elevated cholesterol levels.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Elevated Cholesterol Level** | **Normal Cholesterol Level** | **Total** |
| **Alcoholic Patient** |  |  |  |
| **Nonalcoholic Patient** |  |  |  |
| **Total** |  |  |  |

If a patient is selected at random, find the probability that the patient is the following.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| An alcoholic with normal cholesterol level. |  |  |  |  |
| An alcoholic or has a normal cholesterol level. |  |  |  |  |
| An alcoholic or with an elevated cholesterol level. |  |  |  |  |
| An alcoholic. |  |  |  |  |

1. If one card is drawn from an ordinary deck of cards, find the probability of getting the following.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Event | Mutually Exclusive or Not | Rule | Solution | Answer |
| A jack or a club or a 10 |  |  |  |  |
| An ace or a queen, or a spade. |  |  |  |  |
| A king or a heart or a diamond. |  |  |  |  |
| A queen or a king or a club. |  |  |  |  |