Time Frame: 50 minutes

Subject Matter: Probability and Counting Rules TELL ME

Anticipatory Set:

Evaluate the following.

1. 10C8 3. 9C6
2. 6P4 4. 6P3

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

Standards: DA – 5.2 Use counting techniques to determine the number of possible outcomes for an event.

Materials: PowerPoint Presentation and Worksheets

SHOW ME

Presentation of Information:

*Review the following.*

*Permutation Rule*

* The arrangement of *n* objects in a specific order using *r* objects at a time is called a *permutation of n objects taking r objects at a time*. It is written as nPr, and the formula is

$$nPr= \frac{n!}{\left(n-r\right)!}$$

*Combination Rule*

* The number of combinations of r objects selected from n objects is denoted by nCr, and the formula is

$$nCr= \frac{n!}{\left(n-r\right)!r!}$$

Example 1:

 Find the probability of getting 4 aces when 5 cards are drawn from an ordinary deck of cards.

*Solution:*

* *There are* **52C5***ways to draw 5 cards from a deck.*
* *There is only one way to get 4 aces (*4C4*).*
* *But there are 48 possibilities to get the 5th card.*

*Therefore*

*P(4 aces) =* $\frac{\_{4}C\_{4} × 48}{\_{52}C\_{5}}= \frac{1 ×48}{2,598,960}= \frac{48}{2,598,960}=0.0000185$

Example 2:

 A box contains 24 transistors, 4 of which are defective. If 4 are sold at random, find the following probabilities.

1. Exactly 2 are defective.
2. None is defective.
3. All are defective.
4. At least 1 is defective.
5. ***Solution of “Exactly 2 are defective”.***
* *There are* **24C4***ways to sell 4 transistors.*
* *Two defective transistors can be selected as* 4C2 *and the two non-defective ones as* 20C2

*Therefore*

*P(exactly 2 defectives) =* $\frac{4C2 ×20C2}{24C4}= \frac{6 ×190}{10,626}= \frac{1140}{10,626}=0.1073$

1. ***Solution of “None is defective”.***
* *There are* **24C4***ways to sell 4 transistors.*
* *The number of ways to choose no defectives is* 20C4

*Therefore*

*P(no defectives) =* $\frac{20C4}{24C4}= \frac{4845}{10,626}= 0.4560$

1. ***Solution of “All are defective.”***
* *There are* **24C4***ways to sell 4 transistors.*
* *The number of ways to choose 4 defectives from 4 is* 4C4

*Therefore*

*P(all are defectives) =* $\frac{4C4}{24C4}= \frac{1}{10,626}= 0.0000941$

1. ***Solution of “At least one is defective.”***
* *There are* **24C4***ways to sell 4 transistors.*

*Therefore*

*P(at least 1 defective) = 1 – P(no defective)*

 *=* $1-\frac{20C4}{24C4}$

 *=* $1-\frac{1615}{3542}$

 *=* $1-0.4560$

 *=* $0.5440$

Let Me Try

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: Nov. 29, 2010

1. A store has 6 *TV Graphic* magazines and 8 *Newstime* magazines on the counter. If two customers purchased a magazine, find the probability that one of each magazine was purchased.
2. A combination lock consists of 26 letters of the alphabet. If a 3-letter combination is needed, find the probability that the combination will consist of the letters *ABC* in that order. The same letter can be used more than once. (*Note:* A combination lock is really a permutation lock).
3. There era 8 married couples in a tennis club. If 1 man and 1 woman are selected at random to plan the summer tournament, find the probability that they are married to each other.
4. Find the probability of getting 2 face cards (king, queen ,or jack) when two cards are drawn from a deck of cards without replacement.
5. A parent-teacher committee consisting of 4 people is to be formed from 20 parents and 5 teachers. Find the probability that the committee will consists of these people. (Assume that the selection will be random).
	1. All teachers.
	2. 2 teachers and 2 parents.
	3. All parents.
	4. 1 teacher and 3 parents.
6. In a company there are 7 executives: 4 women and 3 men. Three are selected to attend a management seminar. Find these probabilities.
	1. All 3 selected will be women.
	2. All 3 selected will be men.
	3. 2 men and 1 woman will be selected.
	4. 1 man and 2 women will be selected.