Time Frame: 50 minutes

Subject Matter: Conditional Probability **TELL ME**

Anticipatory Set:

Divide the following without using a calculator.

1. $\frac{\frac{1}{4}}{\frac{3}{2}}$ 2. $\frac{\frac{2}{5}}{\frac{4}{5}}$ 3. $\frac{\frac{4}{3}}{\frac{1}{10}}$

Objective: TSWBAT find the conditional probability of an event.

Standards: DA – 1.1, 1.2, & 1.5

Materials: PowerPoint Presentation and Worksheets

**SHOW ME**

Presentation of Information:

Definition of ***Conditional Probability***

* The conditional probability of an event B in relationship to an event A was defined as the probability that event B occurs after event A has already occurred.
* **Formula for Conditional Probability**
	+ $P\left(A\right)= \frac{P(A and B)}{P(A)}$

**Example 1:**

 A box contains black chips and white chips. A person selects two chips without replacement. If the probability of selecting a black *and* a white chip is $\frac{15}{56}$, and the probability of selecting a black chip on the first draw is $\frac{3}{8}$, find the probability of selecting the white chip on the second draw, *given* that the first chip selected was a black chip.

 Solution:

 Let

**B = selecting a black chip W = selecting a white chip**

 Then

 $P\left(B\right)= \frac{P\left(B and A\right)}{P\left(B\right)}$

$= \frac{^{15}/\_{56}}{^{3}/\_{8}} $

$= \frac{15}{56}×\frac{8}{3}$

$= \frac{5}{7} Answer$

**Example 2:**

 The probability that Sam parks in a no-parking zone and gets a ticket is 0.06, and the probability that Sam cannot find a legal parking space and has to park in the no-parking zone is 0.20. On Tuesday, Sam arrives at school and has to park in a no-parking zone. Find the probability that he will get a parking ticket.

Solution:

 Let

 **N = parking in a no-parking zone T = getting a ticket**

 Then

 $P\left(N\right)= \frac{P\left(N and T\right)}{P\left(N\right)}$

$= \frac{0.06}{0.20}$

$= 0.30 Answer$

**Example 3:**

 A recent survey asked 100 people if they thought women in the armed forces should be permitted to participate in combat. The results of the survey are shown.

|  |  |  |  |
| --- | --- | --- | --- |
| *Gender* | *Yes* | *No* | *Total* |
| Male | **32** | **18** | **50** |
| Female | **8** | **42** | **50** |
| Total | **40** | **60** | **100** |

Find these probabilities.

1. The respondent answered yes, given that the respondent was a female.
2. The respondent was a male, given that the respondent answered no.

Solution:

 Let

**M = respondent was a male Y = respondent answered yes**

**F = respondent was a female N = respondent answered no**

1. The problem is to find ***P(Y***|***F).*** The rule states

 $P\left(F\right)= \frac{P\left(F and Y\right)}{P\left(F\right)}$

$= \frac{^{8}/\_{100}}{^{50}/\_{100}} \frac{\leftarrow is the number of females who responded yes, divided by the total number of respondents}{\leftarrow is the total number of females divided by the total number of respondents } $

$= \frac{8}{100}×\frac{100}{50}$

$= \frac{4}{25} Answer$

1. The problem is to find ***P(M***|***N).*** The rule states

 $P\left(N\right)= \frac{P\left(N and M\right)}{P\left(N\right)}$

$= \frac{^{18}/\_{100}}{^{60}/\_{100}} $

$= \frac{18}{100}×\frac{100}{60}$

$= \frac{3}{10} Answer$

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

**LET ME TRY**

1. At a small college, the probability that a student takes physics and sociology is 0.092. The probability that a student takes sociology is 0.73. Find the probability that a student takes physics, given that he or she is taking sociology.
2. In a certain city, the probability that an automobile will be stolen and found within one week is 0.0009. The probability that an automobile will be stolen is 0.0015. Find the probability that a stolen automobile will be found within one week.
3. A circuit to run a model railroad has eight switches. Two are defective. If a person selects two switches at random and test them, find the probability that the second one is defective, given that the first one is defective.
4. At the Avonlea Country Club, 73% of the members play bridge and swim, and 82% play bridge. If a member is selected at random, find the probability that the member swims, given that the member plays bridge.

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

**HOMEWORK**

1. At a large university, the probability that a student takes calculus and is a dean’s list is 0.042. The probability that a student is in dean’s list is 0.21. Find the probability that a student is taking calculus, given that he or she is on the dean’s list.
2. In Rolling Acres Housing Plan, 42% of the houses have a deck and a garage; 60% have a deck. Find the probability that a home has a garage, given that it has a deck.
3. In a pizza restaurant, 95% of the costumers order pizza and a salad, find the probability that a customer who orders pizza will also orders a salad.
4. At an exclusive country club, 68% of the members play bridge and drink champagne, and 83% play bridge. If a member is selected at random, find the probability that the member drinks champagne, given that he or she plays bridge.