Gamers

A-E Strand(s): Probability/Statistics. Sample Courses: Integrated 1 and Geometry.

Topic/Expectation

　PS.B.1 Compound probability

　　a.　Calculate probabilities of compound events.

　　c.　Show how a two-way frequency table can be used effectively to calculate and study relationships among probabilities for two events.

Rationale

This task provides a context for using a two-way frequency table and a Venn diagram to explore the relationships among probabilities.

Instructional Task

Bobby and Esmeralda, two avid video game players, found a list of the top 100 video games of all time. They discovered that the list had many titles they did not know. The students created a two-way frequency table (also known as a contingency table) displaying the number of games on the list that they had played.

	Esmeralda played	**Esmeralda did not play**	**Total**
Bobby played	6	14	20
Bobby did not play	4	76	80
	10	90	100

Part I.　Determine the probability that if a game was selected at random from the list —

1. Both Esmeralda and Bobby had played the game.

2. Esmeralda had played the game.

3. Only Bobby had played the game.

4. Exactly one of the students had played the game.

5. Bobby had not played the game.

　How does the two-way frequency table assist you in finding the solutions to the above probabilities?

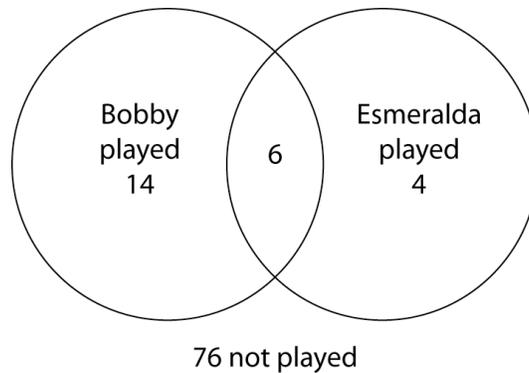Part II. Determine the probability of the following events.

1. Bobby did not play the game given that Esmeralda played it.

2. Esmeralda played the game given that Bobby played it.

Part III.

What are the similarities and differences between the events in Part I and Part II?

Discussion/Guiding Questions/Extensions

Have students make a Venn diagram to pictorially show the relationship given in the frequency table.

76 not played

Sample Solutions

Part I. Determine the probability that if a game was selected at random from the list —

1. P(Both Esmeralda and Bobby had played the game) = *6/100 = 0.06*

2. P(Esmeralda had played the game) = *10/100 = 0.1*

3. P(Only Bobby had played the game) = P(Bobby had played the game and Esmeralda had not played the game) = *14/100 = 0.14*

4. P(Exactly one of the students had played the game) = P(Only Bobby had played the game or only Esmeralda had played the game) = *14/100 + 4/100 = 0.18*

5. P(Bobby had not played the game*)=80/100 = 0.8*

How does the two-way frequency table assist you in finding the solutions to the above probabilities?

Answers may vary: The table organizes the data so that students can more easily see the relationships among the probabilities.

Part II. Determine the probability of the following events.

1. P(Bobby did not play the game given that Esmeralda played it) = *4/10 = 0.4*

2. P(Esmeralda played the game given that Bobby played it) = *6/20 = 0.3*

Part III.

What are the similarities and differences between the events in Part I and Part II?

All probabilities can be represented as fractions. In Part I, all denominators are equal to 100, whereas in Part II, the denominators are a subset of the original events.