Unit 9 Lesson 3 Notes: Sets and Sample Space

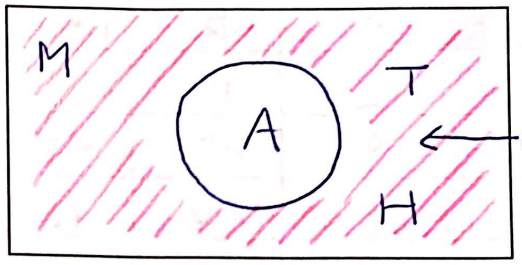
A sample space is The set of all possible outcomes or results

I. Ways to Represent Sample Space

A. Venn Diagram

In a Venn diagram, each event is represented by a circle.

Represent Event A: Choosing a vowel from the word MATH



Possible Outcomes: {M, A, T, H}

Successful outcomes: {A}

What is the complement of choosing a vowel from the word MATH? {M, T, H}

Complement means NOT and is located outside of the circle(s) in the rectangle Notation: A' or A^c

Example: Create a Venn diagram to represent event A: Rolling a number greater than 4

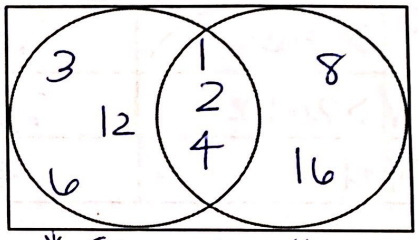
possible outcomes {1, 2, 3, 4, 5, 6}

successful outcomes {5, 6}

Example: Use the Venn Diagram to answer the questions below

Event A: Factors of 12 Event B: Factors of 16

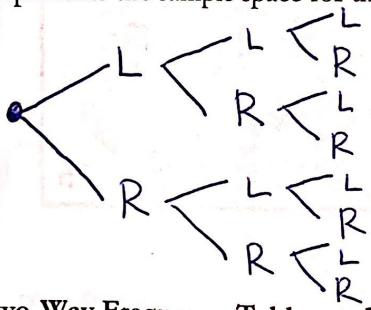
1. Elements of A: {1, 2, 3, 4, 6, 12}
2. Elements of B: {1, 2, 4, 8, 16}
3. A^c:
4. B':
5. Why are 1, 2, and 4 in both sets?



*Start in the middle / intersection!

B. Tree Diagram

You are driving in your driver's ed class. The instructor tells you that you must make three turns on your route. Make a tree diagram that represents the sample space for the outcomes.



LLL LLR LRL LRR RLL RLR RRL RRR

8 outcomes possible

C. Two-Way Frequency Tables and Relative Frequency Tables

A two- way frequency table is used to show the frequency of responses or events. Like a Venn Diagram, a two-way frequency table shows data that pertains to different categories. A relative frequency table shows the percentages that pertain to different categories.

	Play Sport	Do Not Play Sport	Total
Foreign Language	14	23	37
Not in Foreign Language	10	3	13
Total	24	26	50

Example: 50 students are surveyed about their enrollment in a foreign language class and participation in a sport. Of the 50 students, 14 responded that they planned to play a sport and take a foreign language class. 10 students reported that they planned to only play a sport. Only 3 students chose not to participate in either a sport or a foreign language. Construct a two-way frequency table.

Example: A student at Apex Friendship High School was surveying juniors and seniors about whether or not they agreed with a new policy about going off campus for lunch. Of the 46 students that were surveyed, 12 juniors agreed with the policy and 15 seniors disagreed with the policy. There are 20 juniors. Construct a two-way frequency table and relative frequency table to model the data.

	JR	SR	Total
Agree	12	11	23
Disagree	8	15	23
Total	20	26	46

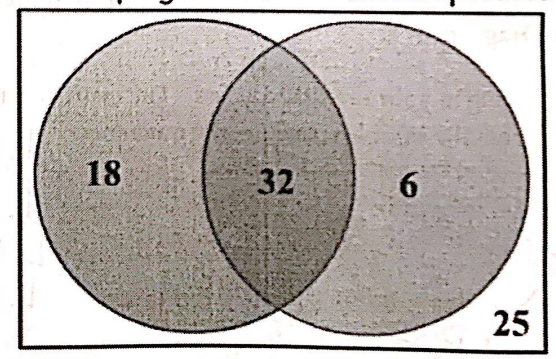
	JR	SR	total
Agree	12/46 .26	11/46 .24	.5
Disagree	8/46 .17	15/46 .33	.5
Total	.43	.57	1 (100%)

1. Create a relative frequency table based on the following survey results.

- 5% watch more than 20 hours of TV a week and exercise more than 20 hours a week.
- 40% of people do not exercise more than 20 hours a week and watch more than 20 hours of TV
- 67% of people do not exercise more than 20 hours a week.

	Exercise > 20 Hrs	NO Exercise > 20 Hrs	Total
TV > 20 Hrs.	.05	.40	.45
NO TV > 20 Hrs.	.28	.27	.55
Total	.33	.67	1

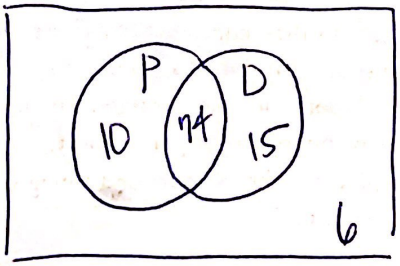
2. Create a two-way table from the data provided in the Venn diagram.



	Have SP	NO SP	total
Have SM	32	18	50
NO SM	6	25	31
total	38	43	81

3. Represent the sample space with a Venn Diagram or Frequency Table.

As each person entered the theater, Aaron counted how many of the 105 (total) people had popcorn and how many had a drink. He found that out of 84 people that had popcorn, only 10 did not have a drink. Six people walked in without popcorn or a drink.



	pop	no pop	total
Drink	74	15	89
no Drink	10	6	16
total	84	21	105