

<b>Define: Sample Space</b>	Set of all possible outcomes
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<p>Example: List the sample space, S, for each of the following:</p> <ol style="list-style-type: none"> <li>Tossing a coin: {Heads &amp; Tails}</li> <li>Rolling a six-sided die: {1, 2, 3, 4, 5, 6}</li> <li>Drawing a marble from a bag that contains two red, three blue, and one white marble: {RRBBBW}</li> </ol>	
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<b>Define: Intersection of two sets (<math>A \cap B</math>)</b>	what the two sets have IN COMMON
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<p>Example:</p> <ol style="list-style-type: none"> <li>Given the following sets, find <math>A \cap B = \{3, 9, 15\}</math>  <math>A = \{1, 3, 5, 7, 9, 11, 13, 15\}</math>   <math>B = \{0, 3, 6, 9, 12, 15\}</math></li> </ol>	
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<b>Define: Union of two sets (<math>A \cup B</math>)</b>	EVERYTHING in both sets
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<p>Example:</p> <ol style="list-style-type: none"> <li>Given the following sets, find <math>A \cup B = \{0, 1, 3, 5, 7, 9, 11, 12, 13, 15\}</math>  <math>A = \{1, 3, 5, 7, 9, 11, 13, 15\}</math>   <math>B = \{0, 3, 6, 9, 12, 15\}</math></li> </ol>	
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<b>Define: Venn Diagram</b>	a way to represent the Union + Intersection of two or more sets
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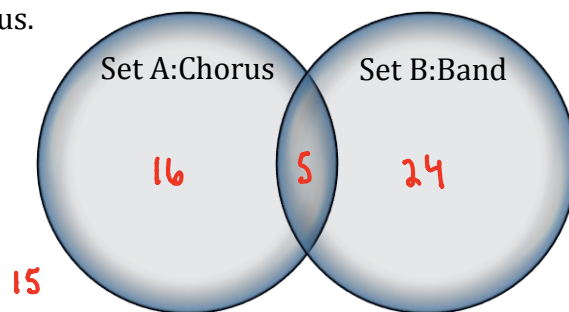
<p>Example: Use the Venn Diagram to answer the following questions</p>	
<ol style="list-style-type: none"> <li>What are the elements of set A? {1, 2, 3, 4, 6, 12}</li> <li>What are the elements of set B? {1, 2, 4, 8, 16}</li> <li>Why are 1, 2, and 4 in both sets? 12 + 16 share those factors</li> <li>What is <math>A \cap B</math>? {1, 2, 4}</li> <li>What is <math>A \cup B</math>? {1, 2, 3, 4, 6, 8, 12, 16}</li> </ol>	

Example: In a class of 60 students, 21 sign up for chorus, 29 sign up for band, and 5 take both. 15 students in the class are not enrolled in either band or chorus.

11. Put this information into a Venn Diagram.

12. What is  $A \cup B$ ? 5

13. What is  $A \cap B$ ? 45



Define: Complement of a Set ( $A^c$ )

*what is not included in the set*

Example:  $S = \{\dots, -3, -2, -1, 0, 1, 2, 3, 4, \dots\}$  and  $A = \{\dots, -2, 0, 2, 4, \dots\}$

14. If A is a subset of S, what is  $A^c$ ?

*$= \{-3, -1, 1, 3\}$*

Example: Use the Venn Diagram above (Chorus vs. Band) to find the following:

15. What is  $A^c$ ? 39

16.  $B^c$ ? 31

17. What is  $(A \cap B)^c$ ? 55

18. What is  $(A \cup B)^c$ ? 15

### On Your Own

- Describe the sample space for picking a colored marble from a bag with red and black marbles. *Note: This may be modeled with set notation.*
- Andrea is shopping for a new cellphone. She is either going to contract with Verizon or with Sprint. She must choose between an Android phone or an iPhone. Describe the sample space. *Note: This may be modeled with set notation.*  $\{VA, VI, SA, SI\}$
- Use the following scenario for #3-7.** In a class of 50 students, 18 take Chorus, 26 take band, and 2 take both Chorus and Band. How many students are not enrolled in either Chorus or Band?

4. What is  $(Chorus \cup Band)$ ? 42

5. What is  $(Chorus \cap Band)$ ? 2

6. What is  $(Chorus \cup Band)^c$ ? 8

7. What is  $(Chorus \cap Band)^c$  48

