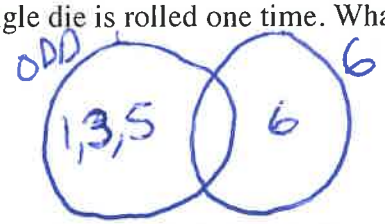
Name: Key, NOTES 3/5/2020

Algebra 2 Probability: Mutually Exclusive Events

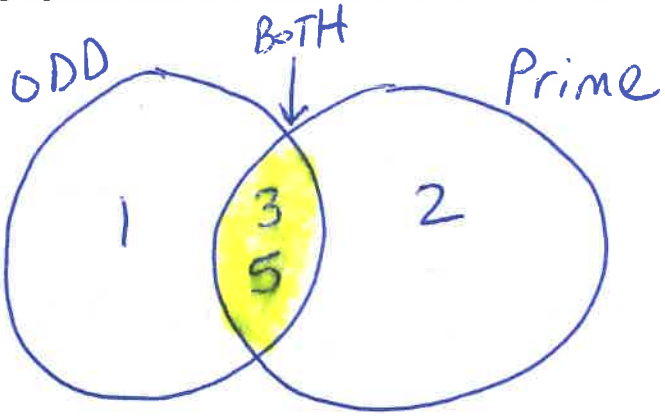
Outcomes Learning Objectives • Understand when two outcomes are mutually exclusive • Understand the concepts of unions and intersections • Be able to compute probabilities using Venn diagrams and formulas

Example 1 A single die is rolled one time. What is the probability of getting either an odd number or a 6?



$\frac{4}{6}$ OR $\boxed{\frac{2}{3}}$

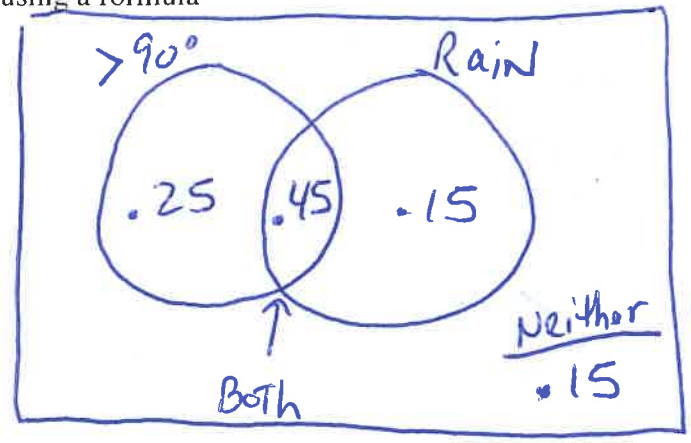
Example 2 A single 6-sided die is rolled. Suppose the outcomes we are interested in are getting an odd number and getting a prime number (2,3, or 5). Draw a Venn diagram for this situation



Example 3 A single 6-sided die is rolled. What is the probability of getting either an odd number or a prime number? Note that this is the same as asking for P(Odd [Prime)

Using Venn above, there are Four possibilities out of 6 sides. Thus: $\frac{4}{6} \rightarrow \boxed{\frac{2}{3}}$

Example 4 Suppose there is a 60% chance it will rain today and that there is a 70% chance that it will be over 90°F. Suppose also that there is a 45% chance that it will both rain and be above 90 degrees. What is the chance that it will neither rain nor be above 90 degrees? Solve using both a Venn diagram and using a formula



Answer: 15% Chance

Example 5 Which pairs of outcomes are mutually exclusive?

a) You go to the pet store to buy a pet. Outcome A = You buy a pet that flies, Outcome B = You buy a pet that has no legs.

Nothing Common → mutually exclusive

b) You order a pizza. Outcome A = Your pizza has pepperoni on it, Outcome B = Your pizza has mushrooms.

Can have both. NOT Mutually Exclusive

c) You select a football player to take a picture of for the yearbook. Outcome A = The player is a 4-year varsity starter, Outcome B = The player is 14 years old.

Can't be 14 yrs old AND Senior! Mutually Exclusive

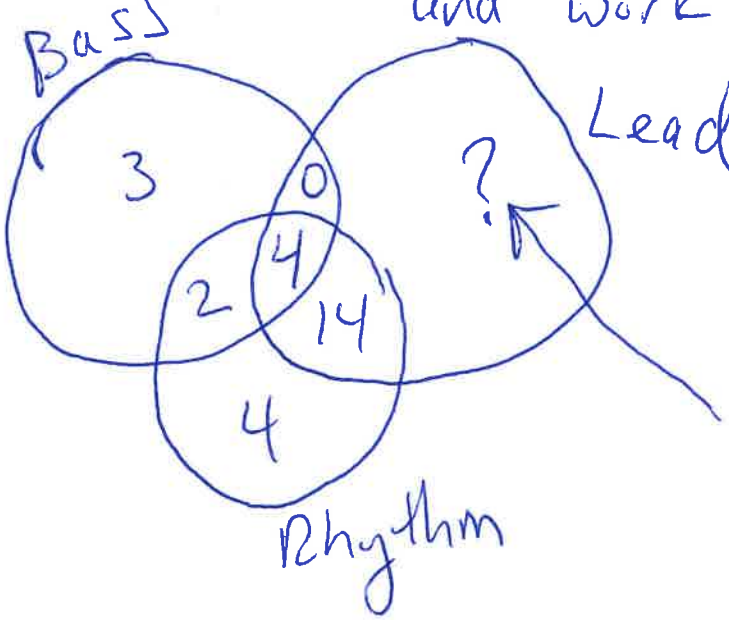
d) Radio stations have 4-letter station names such as KDWB. You decide to pick a radio station to listen to. Outcome A = The station's 4-letter name starts with a W, Outcome B = The station's 4-letter name contains three E's.

Can have both! ex.) WEEE

NOT mutually exclusive

Example 6 The Rockin' Rollers performance company has 30 musicians who play either bass guitar, lead guitar, or rhythm guitar. Some of these musicians play more than one instrument. Suppose 4 musicians can play lead, rhythm, or bass guitar. Fourteen can play lead or rhythm but not bass, two can play bass or rhythm but not lead, 3 can play bass only, and 4 can play rhythm only. There are no musicians who play lead and bass only. Draw a Venn diagram to determine how many musicians play lead only.

* Draw 3-circle Venn
* Start in center intersection and work outward!



3 since diagram must sum to 30 musicians.