

### Unit 9 Probability Review and Extension

1) Complete the other representations from the given information and then tell if the data is independent of each other. (5 points per section)

Note: You should have percentages in the "Notation" section (except for "Sample Size"). However, all of the other representations will have numbers of people not percentages.

Notation	2-way Table																
<p>Key:                      Female = F      Male = M                      Volleyball = V      Soccer = S</p> <p>Sample size =</p> <p><math>P(M) = \frac{135}{250}</math>      <math>P(V) = \frac{88}{250}</math></p> <p><math>P(F V) = \frac{57}{88}</math>      <math>P(F \cup V) =</math></p> <p><math>P(S F) =</math>      <math>P(S \cap M) =</math></p>	<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 20px;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 25%;">Volleyball</th> <th style="width: 25%;">Soccer</th> <th style="width: 35%;">Total</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><b>Female</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;"><b>Male</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;"><b>Total</b></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Volleyball	Soccer	Total	<b>Female</b>				<b>Male</b>				<b>Total</b>			
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Venn Diagram	Tree Diagram																
<div style="border: 1px solid black; width: 100%; height: 100%; position: relative;"> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%);"> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 150px; height: 150px; display: flex; align-items: center; justify-content: center;">Male</div> <div style="border: 1px solid black; border-radius: 50%; width: 150px; height: 150px; display: flex; align-items: center; justify-content: center;">Soccer</div> </div> </div> </div>																	

Is your data independent of each other? (5 points)

2) Use the following information to fill in the Venn Diagram below and answer the questions. (15 points)

100 students were asked which of the following classes they had taken PE, Biology, or English, the following information was recorded.

28 took PE

31 took Biology

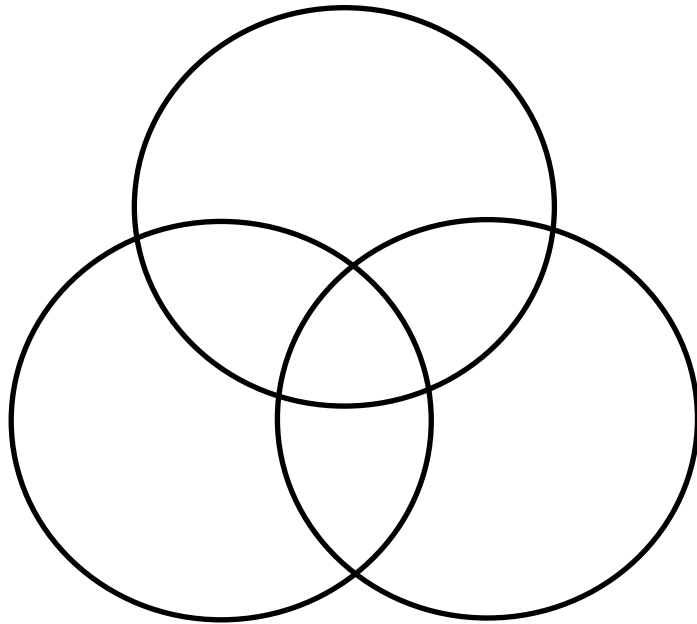
42 took English

9 took PE and Biology

10 took PE and English

6 took Biology and English

4 took all three



a) If one person is chosen at random, what is the probability that the student took Biology?

$$P(\text{biology}) =$$

b) If one person is chosen at random, what is the probability that the student took Biology or English?

$$P(\text{biology} \cup \text{english}) =$$

c) If one person is chosen at random, what is the probability that the student took English and PE?

$$P(\text{english} \cap \text{PE}) =$$

In how many ways can you select 'r' things from a group 'n'?

**Combination:** order does NOT matter, no repeats.  ${}_nC_r = \frac{n!}{r!(n-r)!}$

**Permutation:** order DOES matter, no repeats.  ${}_nP_r = \frac{n!}{(n-r)!}$

3) How many ways can you choose a committee of 4 people from a group of 12? In order to get full credit for this problem you need to work the problem out the long way, showing all of the steps (don't just punch the numbers into the calculator and record the answer).

4) Determine whether each is an example of a **permutation** or a **combination**. Write your answers on the line provided.

a. The number of ways you can choose a group of 3 puppies from the animal shelter when there are 20 breeds to choose from (assume you don't choose the same breed twice).

b. The number of ways you could award 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> place medals for the science fair.

c. The number of 7 digit phone numbers that can be made using the digits 0-9

d. The number of ways you could select 2 students from this class to represent the class in student government.

5) You have a 6 sided dice and a spinner with the numbers 1-10 on it. You roll the dice and spin the spinner at the same time. What is the probability that you get an even number on the die **AND** an even number on the spinner?

**Counting Problems. Circle or put your answers in a box so I can easily grade them. (5 points)**

6) Your favorite restaurant offers 3 appetizers, 6 main courses, 2 side dishes, and 7 types of deserts. If you order one of each, how many different dinners can you order?

7) Determine how many ways a President, Vice President, and Treasurer can be chosen from a math club that has 12 members.

8) There are 7 seniors on the football team that are being considered for as team captains. If there are 3 team captains, how many different ways can the seniors be chosen as captains?

9) How many number of distinguishable permutations of the letters in **ICICLE** can be formed?

10) How many ways are there to select 7 bracelets from a box 20?

11) There are 10 players on a volleyball team. How many ways are there to choose 6 players to take the court? Remember each player has a specific position they are assigned to.

12) You are buying a new scooter to drive to school. There are 7 different colors to choose from, 2 types of seats to choose from, and 12 optional add-ons to get. You can only choose 1 color, 1 seat, and 3 add-ons. How many combinations are there for the scooter you are buying?

13) There are 9 students running a race. How many ways can they finish 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup>?