**#1 Experimental & Theoretical Probability** *Directions: For each problem, identify whether the problem is asking to find theoretical or experimental probability. Then solve.*

1. A box contains 24 green markers, 16 red markers, and 10 blue markers.
	1. *P*(red) b) *P*(green or blue) c) *P*(not green)
2. There are 50 cars in a used car lot. The experimental probability that a car in the lot has two doors is 0.12. How many cars in the lot have two doors?
3. In the following problem, the student made an error. Identify the error and explain how you would correctly solve the problem.

Of 24 movies shown in a theater, three are rated G. What is the theoretical probability that a movie at the theater is rated G.
*P*(G rated) = $\frac{24}{3}$
*P*(G rated) = $\frac{24}{3}=8$

**#2 Counting Principle of Multiplication** *Directions: Use your notes to help you answer the following questions. Don’t forget to label!*

1. You want a sandwich, a side order, and a drink from a lunch cart that offers 4 types of sandwiches, 5 different side orders, and 4 drink choices. How many lunches are possible?

2. The ballot to the right shows the candidates in Ms. Santos’s 1st Period class election. Find the number of different ways a president, treasurer, and secretary can be chosen.

|  |  |  |
| --- | --- | --- |
| **PRESIDENT** | **TREASURER** | **SECRETARY** |
| * Keyauna
* Antoine
* Jaylen
* Quan
* Justice
* Javier
 | * AJ
* Summer
* Amarie
* Shayla
* ZZ
* Kylah
* Reign
* Nay
 | * Maria
* Esme
* Cindy
* Zhanaya
* Zionya
* Riyah
* Ngoan
* Tierra
 |

3. A restaurant has 84 possible meals that you can choose. A meal includes a main course, a salad, and a dessert. The menu lists 7 main courses and 3 types of salads. How many desserts are available?

**#3 Compound Probability** *Directions: Use your notes to solve the following. Be sure to use the correct formulas!*

1. You randomly pick a video and a DVD. What is the probability that you pick an action video and a comedy DVD? Are these events independent or dependent?



1. Students can either play soccer or ruby. About 24% of students play soccer. About 17% of students play rugby. What is the probability that a student chosen at random either participates in soccer or rugby? Are these events independent or dependent?
2. In the following problem, the student made an error. Identify the error and explain how you would correctly solve the problem.

In a cooler there are 8 bottles of grape juice and 12 bottles of orange juice. There are also 6 blueberry yogurts and 9 strawberry yogurts. If you grab a bottle of juice and a yogurt without looking, what is the probability that you get a grape juice and a blueberry yogurt?

Event *A* = picking grape Event *B* = picking blueberry

*P*(*A and B*) = *P(A) + P(B)*
*P*(*A and B*) $=\frac{8}{20}+\frac{6}{15}$

$$=\frac{4}{5}$$

The probability that you get a grape juice and a blueberry yogurt is $\frac{4}{5}$, or 80%

**#4 Venn Diagrams & Two-Way Tables** *Directions: Answer the following story problems by creating a venn diagram. Then choose 1 of the 2 error analysis problems (#5 or #6) to solve.*

1. In a survey of what type of fast food people liked, 24 people said they liked burgers, 35 people said they liked chicken, and 15 people said they liked both burgers and chicken. If 50 people were surveyed, how many people didn’t like either burgers or chicken?



1. At the park, 13 parents have boys and 17 parents have girls. Four parents have both boys and girls. How many parents have only boys?
2. 150 people have wood floors in their houses and 134 people have carpet in their houses. If 26 people have both wood floor and carpet in their house, how many have only carpets? How many have only wood floors?
3. Use the venn diagram below to answer the following questions.
4. If everyone surveyed liked chocolate, strawberry, or vanilla ice cream, how many people were surveyed?
5. How many people like vanilla or strawberry ice cream?
6. How many people only like chocolate ice cream?
7. How many people like all three flavors?
8. How many people like strawberry and chocolate ice cream?
9. In the following problem, the student made an error. Identify the error and explain how you would correctly solve the problem.

A survey asked 40 people where they learned about news of current events. What is the probability that a person gets the news online, given that the person is female?

*P*(*female and online*) $=\frac{8}{40}=\frac{1}{5}$

The probability that a person gets the news online given that the person is female is $\frac{1}{5}$, or 20%

1. In the following problem, the student made an error. Identify the error and explain how you would correctly solve the problem.

Suppose you choose a tile at random from a bag that contains 3 red, 3 blue, and 4 green tiles. You replace the tile in the bag and then choose again. What is the probability that you choose a green tile, then a red tile?

*P*(*green*) $=\frac{4}{10}$ *P*(*red*) $=\frac{3}{10}$

*P*(*green and red*) = *P(green) + P(red)*

$$P(green and red) =\frac{4}{10}+\frac{3}{10}$$

$$=\frac{7}{10}$$

**#5 Conditional Probability** *Directions: Use the table below to find each probability. The table gives information about students at school.*

1. P(sports | female) 2. P(female | sports) 3. P(reading | male)
2. P(male | reading) 5. P(hiking | female) 6. P(hiking | male)
3. P(male | shopping) 8. P(female | shopping)

9. (Multiple Choice) At the University of Illinois, 47% of the students are female. Also, 8.5% of the students are married females. If a student is selected at random, what is the probability that the student is married, given that the student is female?

a) $\frac{0.085}{0.47}$ b) $\frac{0.47}{0.085}$ c) (0.085)(0.47) d) 0.085 e) 0.47

**#6 Permutations & Combinations** *Directions:* *In each story, determine a) if the order does/does not matter and b) if it’s an example of a permutation/combination. c) Identify n and r. d) Compute the final answer.*

1. **Story A:** Four freshmen are chosen from eighteen to be a member of the leadership board.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

 **Story B:** Four freshmen are chosen from eighteen to be the Class President, Vice President, Secretary, and Treasurer.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

2. **Story A:** Choose five students in a class of twenty to sit in a specific seat.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

 **Story B:** Choose five students in a class of twenty to form a group.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

3. **Story A:** Choose six songs out of twenty to make a specific playlist for your party.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

 **Story B:** Choose six songs out of twenty to download.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

4. **Story A:** Three out of twelve students will make the baseball team.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

 **Story B:** Three out of twelve students will be chosen as the catcher, pitcher, and 3rd baseman.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

5. **Story A:** Threetrumpet playersout of six are chosen to play.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

 **Story B:** Three trumpet players out of six are chosen for 1st chair, 2nd chair, and 3rd chair.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

6. **Story A:** Five out of seven patients are called to remind them of their appointment.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_

 **Story B:** Five out of seven patients are called to schedule a specific appointment time.

Circle: Order Matters / Order Doesn’t Matter Circle: Permutation / Combination

n = \_\_\_\_\_ ; r = \_\_\_\_\_