

Name: Key Date: 3/9/2020

### HansenMATH Algebra 2 Study Guide – Probability Unit

1.) In your own words, explain the difference between  $5P2$  and  $5C2$ .

$5P2 \rightarrow$  out of 5, arrange by 2 (specific, or order matters)  
 $5C2 \rightarrow$  out of 5, arrange by groups of 2 (order doesn't matter)

2.) What does  $4!$  tell you to do?

$4 \times 3 \times 2 \times 1$  OR putting 4 things in order

3.) **Foods of India** restaurant in Ann Arbor is featuring a weekday special, with choice of Chicken, Lamb, or Fish for an entree; Bread or Rice for a side; and Ice Cream for dessert.

a.) How many different meals can be ordered? Formula:  $3 \times 2 \times 1$  Answer: 6

4.) Mr. Hansen's parents have six cats in their house: Vito, Sasha, Boots, Georgie, Dumpling, and Bear! When Momma Hansen cleans out their litter box, cats quickly line up to enjoy the clean facility! If any three of the six cats get in line for the litter box, in how many different ways can they line up?

Formula:  $6P3$  Answer: 120 ways

5.) Trystan's eyes are getting heavy. He's starting to dream about sheep, and he sees a pink, red, green, blue, black, and gray sheep (That's 6 sheep, if you're too sleepy to count.) If any two sheep jump the fence in his dream, how many combinations are possible?

Formula:  $6C2$  Answer: 15

6.) Kevin got paid on Monday, so he's stocking up on goods from 7-11. Out of 5 flavors of Doritos he will buy 3, AND out of 4 flavors of Skittles he's gonna buy 2. How many ways can Candy Man complete his purchase?

Formula:  $\frac{5C3}{10} * \frac{4C2}{6}$  Answer: 60

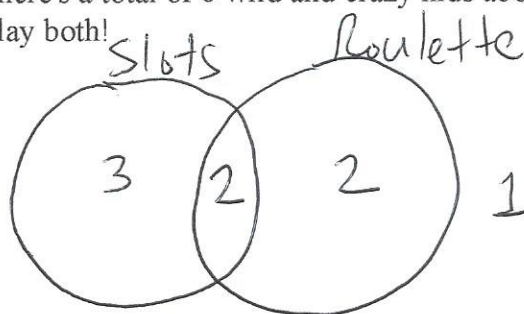
7.) Four cards are drawn from a standard deck, *without* replacement. Find the probability that:

a.) all are Queens.  $\frac{4}{52} \cdot \frac{3}{51} \cdot \frac{2}{50} \cdot \frac{1}{49} = \frac{24}{6,497,400}$

b.) all are red cards  $\frac{26}{52} \cdot \frac{25}{51} \cdot \frac{24}{50} \cdot \frac{23}{49} = \frac{358,800}{6,497,400}$

c.) all are Hearts  $\frac{13}{52} \cdot \frac{12}{51} \cdot \frac{11}{50} \cdot \frac{10}{49} = \frac{17,160}{6,497,400}$

8.) Huslen is driving Chiemi, Cody, Cam, Camille, and Charlie to Motor City Casino – don't ask me why! Whilst there, however, they run into Mia and Urja - so there's a total of 8 wild and crazy kids about to party. Of these eight amigos, 5 play slots, 4 play roulette, and 2 play both!



a) Draw and label a Venn diagram for this situation.

b) How many play neither slots nor roulette? 1

c) How many play slots, but not roulette? 3

d) What is the probability a randomly selected player plays roulette?  $\frac{4}{8}$  or  $\frac{1}{2}$

e.) What is the probability a randomly selected player plays slots, GIVEN that they play roulette?

Given roulette  $\rightarrow \frac{2}{4} = \frac{1}{2}$

9.) Using the table below, add in the row and column totals, to help you answer the following:

	GM	Ford	Chrysler	Toyota	TOTALS
Cars	14	11	12	7	44
Trucks	8	9	5	6	28
Vans	2	3	5	3	13
TOTALS	24	23	22	16	85

What is the probability that a randomly selected vehicle is:

a.) a Ford?  $\frac{23}{85}$

b.) a truck?  $\frac{28}{85}$

c.) A van or a Toyota?  $\frac{13+16-3}{85} = \frac{26}{85}$

d.) a car given that the vehicle is built by GM?  $\frac{14}{24}$

e) a Ford given that the vehicle is a truck?  $\frac{9}{28}$

15 TOTAL

10.) A bag contains ten red cubes numbered 1 to 10 and five green cubes numbered 1 to 5. Two cubes are pulled from the bag at random without replacement. What is the probability that the two cubes are:

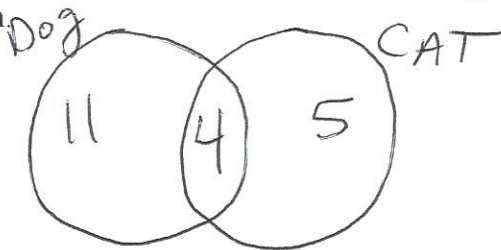
a) both red?  $\frac{10}{15} \cdot \frac{9}{14} = \frac{90}{210}$

b) both odd?

Red: 1, 3, 5, 7, 9  
green: 1, 3, 5  
 $\frac{8}{15} \cdot \frac{7}{14} = \frac{56}{210}$

11.) A pet store surveys its customers during the day and finds that 15 customers own dogs and 9 own cats. Included in these were 4 customers who owned both.

a) Draw a Venn diagram for this situation →



b) How many total customers were surveyed? 20

c) Suppose one of these customers was selected at random. What is P(own a dog)?  $\frac{15}{20}$

d) Suppose one of these customers was selected at random. What is P(own only a dog)?  $\frac{11}{20}$

e) Suppose one of these customers was selected at random. What is P(own a dog|own a cat)?  $\frac{4}{9}$

f) Suppose one of these customers was selected at random. What is P(own a cat|own a dog)?

$$\frac{4}{15}$$

12.) A Bowling Alley has the following bowling balls in its inventory:

If a ball is randomly selected, what is the probability that the ball is:

a.) right-handed  $\frac{42}{50}$

b.) 16-lbs  $\frac{15}{50}$

c.) left-handed OR 10-lbs  $\frac{8 + 35 - 2}{50} = \frac{41}{50}$

**Inventory of balls**

50 bowling balls  
42 are right-handed  
8 are left-handed  
35 are 10-lbs  
15 are 16-lbs  
2 of the left-handed balls are 10-lbs

