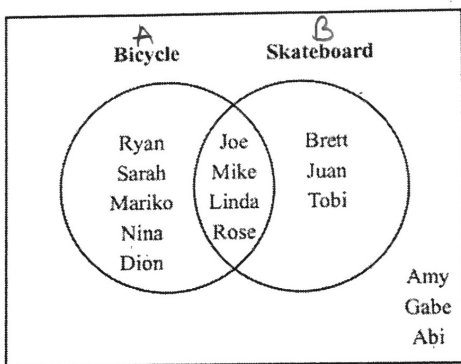


Accelerated Geom/Alg 2
Probability Review

Name Key
Block _____

*****Use your quiz, HW quiz, and IB questions to review along with your review sheet!*****

1. In the Venn diagram below, let set A be the names of students who own bicycles, and let set B be the names of students who own skateboards.



a. Find A. Find $P(A)$.

$\{Ryan, Sarah, Mariko, Nina, Dion, Joe, Mike, Linda, Rose\}$ $P(A) = \frac{9}{15} = \frac{3}{5}$

b. Find $A \cup B$. Find $P(A \cup B)$.

$\{Ryan, Sarah, Mariko, Nina, Dion, Joe, Mike, Linda, Rose, Brett, Juan, Tobi\}$
 $P(A \cup B) = \frac{12}{15} = \frac{4}{5}$

c. Find $(A \cup B)'$. Find $P(A \cup B)'$.

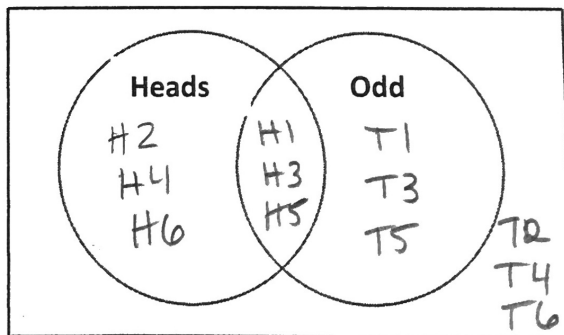
$\{Amy, Gabe, Abi\}$ $P(A \cup B)' = \frac{3}{15} = \frac{1}{5}$

2. You flip a coin and roll a die at the same time.

a. List the sample space below (all possible outcomes)

$\{H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6\}$

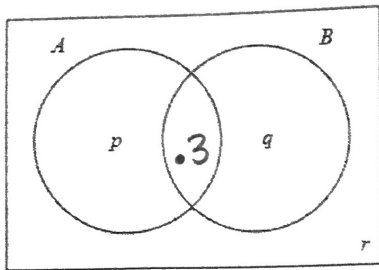
b. Create a Venn diagram with the sample space above using the outcomes of heads and odd.



c. Find $P(A \cap B)$.

$\frac{3}{12} = \frac{1}{4}$

3. Consider the events A and B , where $P(A) = 0.5$, $P(B) = 0.7$ and $P(A \cap B) = 0.3$. The Venn diagram below shows the events A and B , and the probabilities p , q and r .



Write down the value of

a. $p = .2$

b. $q = .4$

c. $r = .1$

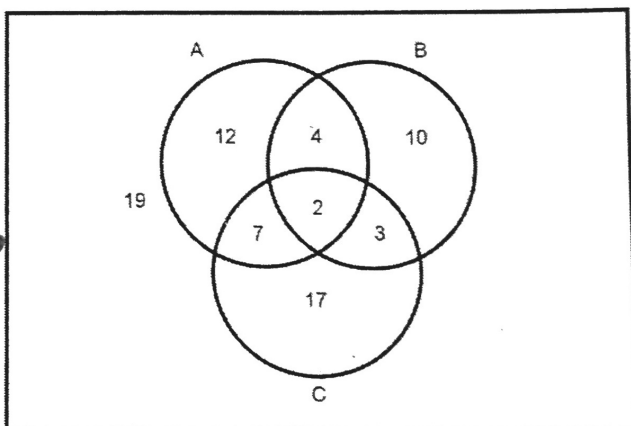
4. For the diagram below, a certain number of people was asked which video game console currently resides in the home. Let A represent the people who own a PS4, let B represent people who own an Xbox 1 and let C represent people who own a Nintendo Wii.

a. Find $P(B \cup C) = \frac{43}{74} = .58$

b. Find $P(A \cap C) = \frac{65}{74} = .88$

c. Find $P(A \cap B \cap C) = \frac{2}{74} = \frac{1}{37} = .03$

d. Find $P(A \cup B) = \frac{36}{74} = \frac{18}{37} = .49$



5. Assume that the following events are independent:

- The probability that a high school senior eats breakfast is 0.8.
- The probability that a high school senior will eat breakfast and get over 6 hours of sleep is 0.2.

What is the probability that a high school senior will get over 6 hours of sleep, **given** that the person ate breakfast?

$$P(S|B) = \frac{P(S \cap B)}{P(B)} = \frac{.2}{.8} = .25$$

6. Assume Set A and Set B are **independent**. Find the missing value. Show all work.

Given $P(A) = 0.8$ and $P(A \cap B) = 0.34$, find $P(B) = \underline{.425}$

$$P(A) \cdot P(B) = P(A \cap B)$$

7. A survey at a local college asked a random sample of faculty and a random sample of students the color of the car that they would like to drive. The results are given in the table.

	Faculty	Student	
Silver	40	10	50
Black	20	147	167
Red	35	86	121
Other	25	17	42
	120	260	380

- a. If a person is chosen at random from all those surveyed, what is the probability that they would like a black car?

$$\frac{167}{380} = .44$$

- b. Given that a randomly selected person is a faculty member, what is the probability that they would like a silver or red car?

$$\frac{75}{120} = \frac{5}{8} = .625$$

- c. What is the probability that a person would like a red car or is a student?

$$\frac{295}{380} = \frac{59}{76} = .78$$

- d. Are the events "faculty member" and "black car" independent? Justify your answer.

$$P(F) \cdot P(B) = P(F \cap B)$$

$$\frac{120}{380} \cdot \frac{167}{380} = \frac{20}{380}$$

$$.1180 \neq .0526$$

Not independent

8. Use the table below to answer the following questions:

Employment Survey Results

Employment Status	Age (in Years)		
	Less than 18	18 or greater	
Has Job	20	587	607
Does Not Have Job	245	92	337
	265	679	944

- a) What is the probability that a randomly selected person does not have a job and is less than 18 years old? $\frac{245}{944} = .26$

- b) What is the probability that a randomly selected person is less than 18 years old, given that the person has a job? $\frac{20}{607} = .03$

$$\frac{20}{607} = .03$$

- c) What is the probability that a randomly selected person is greater than or equal to 18 years old, given that the person has a job? $\frac{587}{607} = .97$

$$\frac{587}{607} = .97$$

- d) Are having a job (A) and being 18 or greater (B) independent events? Justify your answer by showing all work.

$$P(A) \cdot P(B) = P(A \cap B)$$

$$\frac{607}{944} \cdot \frac{679}{944} = \frac{587}{944}$$

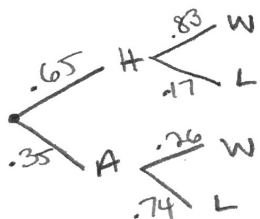
$$.4625 \neq .6218$$

Not Independent

9. In any given season, a soccer team plays 65% of their games at home. When the team plays at home, they win 83% of their games. When they play away from home, they win 26% of their games.

The team plays one game.

- (a) Find the probability that the team wins the game.



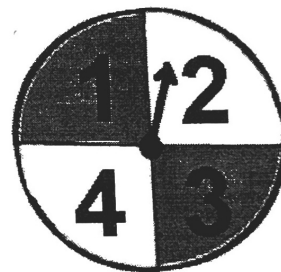
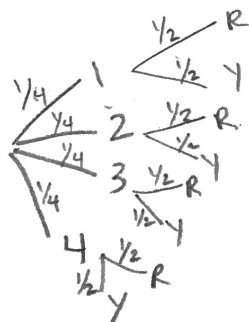
$$P(W) = (.65)(.83) + (.35)(.26) = .6305$$

- (b) If the team wins the game, find the probability that the game was played at home.

$$P(H|W) = \frac{(.65)(.83)}{.6305} = .8557$$

10. The spinner of equal portions, shown below, is spun once where the number is recorded. The spinner is then spun again and the color (red or yellow) is recorded.

- a. Draw a tree diagram to show the outcomes.



- b. What is the probability of landing on red?

$$P(R) = \left(\frac{1}{4}\right)\left(\frac{1}{2}\right) + \left(\frac{1}{4}\right)\left(\frac{1}{2}\right) + \left(\frac{1}{4}\right)\left(\frac{1}{2}\right) + \left(\frac{1}{4}\right)\left(\frac{1}{2}\right) = \frac{1}{2}$$

- c. What is the probability of landing on 3 given that you landed on red.

$$P(3|R) = \frac{\left(\frac{1}{4}\right)\left(\frac{1}{2}\right)}{\frac{1}{2}} = \frac{1}{4}$$

11. Let A and B be independent events such that $P(A) = 0.3$ and $P(B) = 0.8$.

(a) Find $P(A \cap B)$. $(.3)(.8) = .24$

(b) Find $P(A \cup B)$. $(.3) + (.8) - (.24) = .86$

- (c) Are A and B mutually exclusive? Justify your answer.

No because two events cannot be independent and mutually exclusive.