

Name HW Day 1

Probability – Day1 HW (Sample Spaces, Subsets and Basic Probability)

- 1) Suppose a box contains three marbles, one red, one blue, and one white. One marble is selected, its color is observed, and then the marble is placed back in the box. The marbles are scrambled, and again, a marble is selected and its color is observed. What is the sample space of the experiment?

$S = \{RR, RB, RW, BB, BR, BW, WW, WR, WB\}$

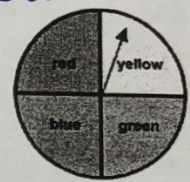
- 2) Suppose you have a standard deck of 52 cards. Let:

A: draw a 7

B: draw a Diamond

- a. Describe  $A \cup B$  for this experiment: all 7's And all diamonds  
 b. Describe  $A \cap B$  for this experiment: The 7 of diamonds

- 3) Think about a spinner like the one pictured to the right:



- a) What is the sample space for a single spin of a spinner with red, blue, yellow and green sections spinner?

$S = \{R, B, Y, G\}$

- b) What is the sample space for 2 spins of the first spinner?

$S = \{RR, RB, RY, RG, BB, BR, BY, BG, YR, YB, YG, GR, GB, GY\}$

- 4) Consider the throw of a die experiment. Assume we define the following events:

A: observe an even number

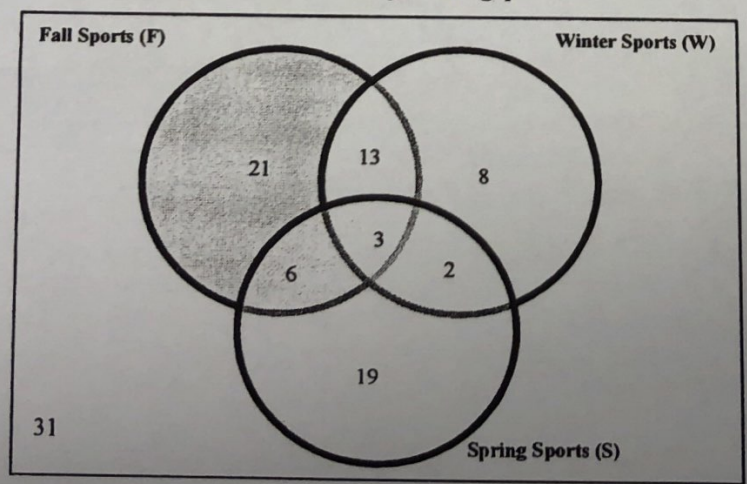
B: observe a number less than or equal to 3

$\{2, 4, 6\}$   
 $\{1, 2, 3\}$   
 $\{1, 2, 3, 4, 6\}$   
 $\{2\}$

Describe  $A \cup B$  for this experiment:

Describe  $A \cap B$  for this experiment:

Use the diagram to answer the following questions



- 5) How many students play sports year-round?  $(F \cap W \cap S)$  3 (intersection of all 3)  
 6) How many students play sports in the spring and fall?  $(S \cap F)$  6 (intersection F & S)  
 7) How many students play sports in the winter or fall?  $(W \cup F)$   $13 + 8 + 2 + 3 + 21 + 6 = 53$   
 8) How many students play sports in the winter or spring or fall?  $(W \cup S \cup F)$  all circles added = 72  
 9) How many students play only one sport?  $21 + 8 + 19 = 48$   
 10) How many students don't play a sport?  $(W \cup S \cup F)^c$  31



# 16 candies

11) Suppose you have a jar of candies: 4 red, 5 purple and 7 green. Find the probabilities of the following events:

- a) Selecting a red candy.  $P(\text{red}) = 4/16 = 1/4$
- b) Selecting a purple candy.  $P(\text{purple}) = 5/16$
- c) Selecting a green or red candy.  $P(\text{green or red}) = 11/16$
- d) Selecting a yellow candy.  $P(\text{yellow}) = 0/16 = 0$
- e) Selecting any color except a green candy.

$P(\text{not green}) = 9/16$

12) Find the odds of selecting a red candy from Question 1.

$\frac{\text{red}}{\text{non-red}} = \frac{4}{12} = 1/3$

13) Find the odds of selecting a purple or green candy from Question 1.

$\frac{\text{purple or green}}{\text{not purple or green}} = \frac{12}{4} = 3/1$

14) Suppose you have a standard deck of 52 cards. Let:

A: draw a 7 4 cards

B: draw a Diamond 13 cards 1 of which is 7

a. Find the probability of  $A \cup B$ .  $P(7's \text{ or } \text{Diamonds}) = \frac{16}{52} = \frac{4}{13}$

b. Find the probability of  $A \cap B$ .

$P(7 \text{ And } \text{Diamonds}) = 1/52$

15) Suppose a box contains six marbles, three red, two blue, and one white.

a) What is the probability of randomly selecting a blue marble,  $P(B)$ ?

$P(B) = 2/6 = 1/3$

b) What is the probability of randomly selecting a red OR white marble?  $P(R \cup W)$ ?

$P(R \cup W) = 4/6 = 2/3$

c) If you have already selected a red marble, what is the probability of selecting a blue marble if

you don't replace the red?  $2/5$

d) Why is your answer to c) different than a)

One marble was taken out of the bag (the red marble) and was not replaced. You still have 2 blue marbles but only 5 total marbles.

3/4}

all 3)

7/85)

53

12