

Find and sit in your new seat!



# Intro to Probability!

Experimental Probability

Theoretical Probability

NAME: \_\_\_\_\_ TITLE: \_\_\_\_\_

### Rochambeau – Experimental Probability

**Experimental Probability:**  $P(E) = \frac{\text{\# of times that event } E \text{ occurs in the experiment}}{\text{\# of total possible outcomes}}$

**Rules to the game:**

Simultaneously on the count of three, each person gives a hand sign: rock, paper or scissors. Students will work in groups of four. Three students will play the game and one student will record. Play the game 10 times. Record the number of times there are three matching signs, two matching signs or no matching signs.

Your team will play Rochambeau. The recorder should record the winner for each game. Play **10 games**. Points will be assigned as follows:

- Player A gets a point each time all three players match.
- Player B gets a point each time two of the three players match.
- Player C gets a point each time none of the players match.

GAME	# OF MATCHES	WINNER OF GAME
1	2	B
2	3	A
3	2	A
4	2	B
5	2	B
6		
7		
8		
9		
10		

List the names of the people in your team alphabetically. The first person on the list is Player A, the next is Player B, the third is Player C, and the fourth is the recorder. Write down who has each role.

Player A:

Player C:

Player B:

Recorder:

After you have played 10 times calculate the probability of Player A winning, Player B and Player C. Give as a fraction and a decimal.

1. Probability (Player A/3 Matches) =  $\frac{1}{10}$      $\frac{2}{10}$      $\frac{3}{10}$      $\frac{0}{10}$      $\frac{0}{10}$
2. Probability (Player B/2 Matches) =  $\frac{4}{10}$      $\frac{8}{10}$      $\frac{9}{10}$      $\frac{9}{10}$      $\frac{9}{10}$
3. Probability (Player C/No Matches) =  $\frac{0}{10}$      $0$      $\frac{2}{10}$      $\frac{1}{10}$      $\frac{7}{10}$



**Another Representation of Theoretical Probability – Two-Way Tables!**

List the sample space for the possible combinations of ROCK, PAPER, and SCISSORS if two people are playing. List the event from Player A first, then Player B second.

		Player B		
		Rock	Paper	Scissors
Player A	Rock	RR	RP	RS
	Paper	PR	PP	PS
	Scissors	SR	SP	SS

Now, combine the above sample space with the possible combinations of ROCK, PAPER, and SCISSORS with a third player, Player C. List the event from Player A and B first, then Player C second.



		Player C		
		Rock	Paper	Scissors
Players A & B	RR	RRR	RRP	RRS
	RP	RPR	RPP	RPS
	RS	RSR	RSP	RSS
	PR	PRR	PRP	PRS
	PP	PPR	PPP	PPS
	PS			
	SR			
	SP			SPS
	SS	SSR		

Which method did you like better to create your sample space?

Are there advantages or disadvantages to each method?

What do you think?

What's the difference between experimental  
and theoretical probability?

Experimental Probability

Theoretical Probability

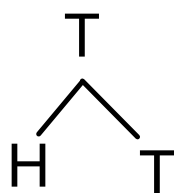
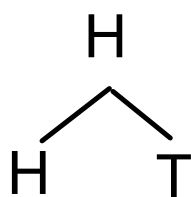
What is a sample space?

List of all possible outcomes

State the sample space of flipping a coin twice







Sample Space: \_\_\_\_\_

Sample Space - HH, HT, TH, TT

Find the probability of the following events

P(2 heads)  $\frac{1}{4}$

P(one head and one tail)  $\frac{2}{4}$

P(no heads)  $\frac{1}{4}$

P(both flips the same)  $\frac{2}{4}$

P(3 heads) 0

Theoretical or Experimental??

The following marbles are in a bag.

What color are you most likely to select?

What color are you least likely to select?



The following marbles are in a bag.

What is the probability of getting a black marble?



What is the probability of getting **not** a black marble?



What do you notice about the two probabilities??

What is the probability of getting a blue marble?



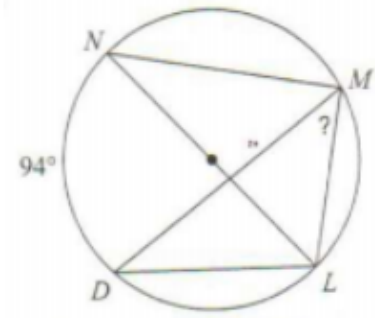
What is the probability of getting not a red marble?





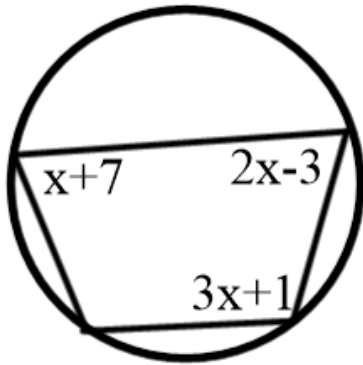
Go over most missed questions on test...

#3 Find the measure of angle DML.

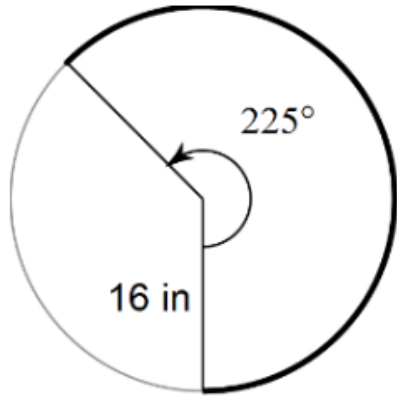




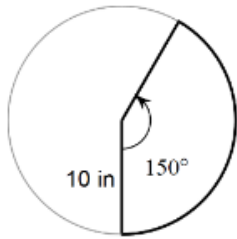
#6

Find the value of  $x$ .

**#11** Find the **length** of the bold arc. Leave answer in exact form.



**#12** Find the area of the sector in bold. Leave answer in exact form.



**#20** Write the equation of the circle with the following info:

Center:  $(0, 1)$

Point on Circle:  $(-18, 1)$

**#21** Write the equation of the circle with the following info:

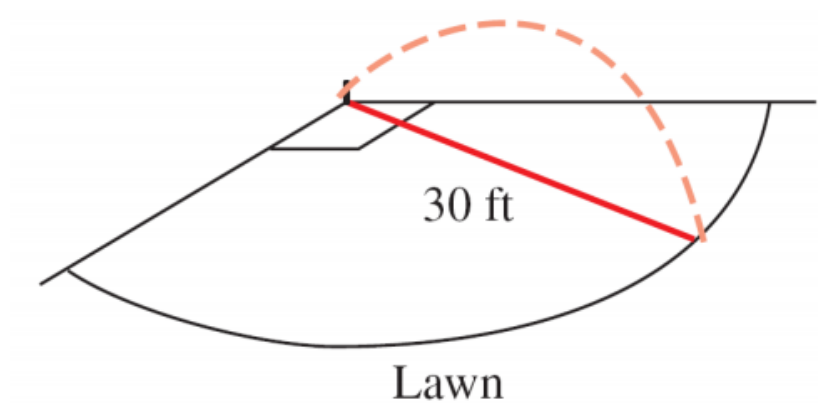
Center:  $(-15, 11)$

Circumference:  $6\pi$

**#23** Write the equation of the circle in standard form:

$$x^2 + y^2 - 4x + 24y + 112 = 0$$

- #24 A lawn sprinkler location at the corner of a yard is set to rotate 90 degrees and project water 30 feet. What **area** of the lawn is watered by the sprinkler?



**#25** A Ferris Wheel has 16 seats and a diameter of 60 feet. The wheel lets off the passengers, then revolves until the next seat is at the platform. Approximately how far does the first seat travel before the Ferris Wheel is stopped to load the next seat?







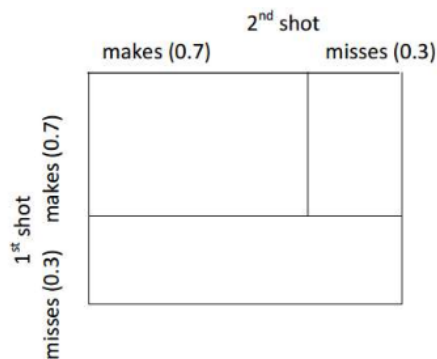


5. Use question #2 to answer the following.
- In a standard casino dice game the roller wins on the first roll if he rolls a sum of 7 or 11. What is the probability of winning on the first roll?
  - The player loses on the first roll if he rolls a sum of 2, 3, or 12. What is the probability of losing on the first roll?
  - If the player rolls any other sum, he continues to roll the dice until the first sum he rolled comes up again or until he rolls a 7, whichever happens first. What is the probability that the game continues after the first roll?
6. Still using question #2, in a different game of dice, you win if you roll a sum of six, lose if you roll a sum of seven. If anything else happens you ignore the results and roll again.
- How many ways are there to get a sum of six?
  - How many ways are there to get a sum of seven?
  - How many possible outcomes are important in this problem?

7. Rimshot McGee has a 70% free throw average. The opposing team is ahead by one point. Rimshot is at the foul line in a one-and-one situation with just seconds left in the game. (A one-and-one situation means that the player shoots a free throw. (If he makes the shot, he is allowed to shoot another. If he misses the shot, he gets no second shot. Each shot made is worth one point.)

a) Take a guess. What do you think is the most likely outcome for Rimshot (use the sample space from question #3 to help if necessary)?

b) Jeremy is working on the problem with Jenna and he remembers that area models are sometimes useful for solving problems related to probability. They set up the following area model. Which part of the model represents Rimshot getting one point? How can you use the model to help you calculate the probability that Rimshot will get exactly one point?



c) Use a model to find the probability of each outcome (0 points, 1 point, 2 points). What is the most likely of the three outcomes?

8. Eddie told Alfred, "I'll bet if I flip three coins I can get exactly two heads." Alfred replied, "I'll bet I can get exactly two heads if I flip four coins!" Eddie scoffed. "Well, so what? That's easier." Alfred argues, "No, it's not. It's harder." Who is correct? Show all of your work and be prepared to defend your conclusion.



