─────── **Warm–Up** ───────

Directions: Add and subtract the fractions to find the sum or difference. Simplify if necessary.

1. $\frac{3}{7} + \frac{2}{14} =$	**2.** $\frac{5}{6} + \frac{2}{3} =$
3. $\frac{1}{3} + \frac{4}{9} + \frac{1}{9} =$	**4.** $\frac{7}{11} + \frac{9}{11} + \frac{3}{11} =$
5. $\frac{9}{12} - \frac{1}{6} =$	**6.** $1\frac{2}{7} - \frac{9}{14} =$
7. $\frac{8}{9} - \frac{2}{3} =$	**8.** $\frac{4}{5} - \frac{4}{15} =$

Directions: Complete the following SOLVE problem with your teacher. You will only complete the S step.

Josh and Daniel are playing a probability game in math class. Each of the boys rolls a fair number cube with the numbers 1, 2, 3, 4, 5, and 6 on the cube. Josh is trying to roll a number less than 3. Daniel is trying to roll an even number. If they each roll the number cube one time, which student is more likely to roll one of their numbers?

S Underline the question.
    This problem is asking me to find _____

    _____.

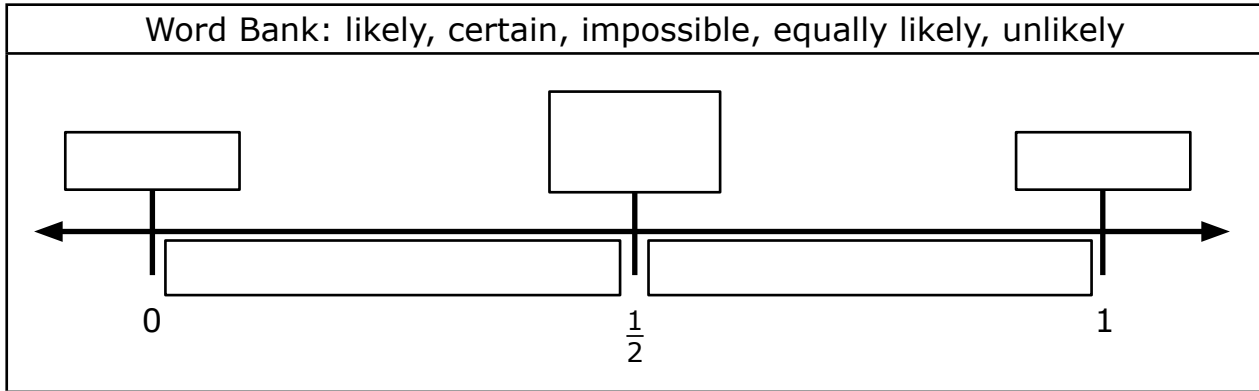**Directions:** Complete this page with your teacher and partner.

	Event 1 Rolling a 7	Event 2 Rolling a number less than 2	Event 3 Rolling an even number	Event 4 Rolling a number greater than 1	Event 5 Rolling a number from 1 - 6
Explanation					
What does this mean?					
Likelihood					

Word Bank:

certain	impossible	likely	unlikely	equally likely

Directions: Complete this page with your teacher and partner.

Word Bank: likely, certain, impossible, equally likely, unlikely

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[ ]              [ ]                        [ ]
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     0                  1/2                  1
     [              ]  [                ]
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1. A bag of marbles contains 3 red marbles, 15 green marbles, 10 blue marbles, and 2 yellow marbles. All the marbles have designs on them. Complete the table.

Likelihood	Impossible	Unlikely	Equally Likely	Likely	Certain
Event	Picking a purple marble	Picking a yellow marble	Picking a green marble	Picking a green or blue marble	Picking a marble that has a design
Explanation					

2. A spinner has 8 equal sections that are numbered from 1 – 8. Complete the table with your partner to create an event for each section and give an explanation to support your event.

Likelihood	Impossible	Unlikely	Equally Likely	Likely	Certain
Event					
Explanation					

Directions: Complete this page with your teacher and partner.

Likelihood can be expressed with words such as "unlikely" or "certain", but sometimes we need to find the numerical value to identify the likelihood of an event occurring.

In order to determine the numerical value that identifies the likelihood of an event occurring, we need to know how many different ways an event can happen. All the ways an event could occur are called the _____.
Use the information in the chart below to find the possible outcomes for each event.

Event	Possible Outcomes	Number of Possible Outcomes
1. A coin is flipped and will land on heads or tails.		
2. A number cube labeled 1 - 6 is rolled.		
3. A spinner with 8 equal sections labeled 1 - 8 is spun.		
4. A marble is chosen from a bag containing 7 red, 6 green, and 8 blue marbles.		
5. A bag of change contains 4 nickels, 1 quarter, 5 dimes, and 15 pennies. A coin is chosen.		

6. Look at Question 4 in the chart. How many marbles are there in the event? ___ What is the number of possible outcomes? ___ Why are there are only 3 possible outcomes?

7. Look at Question 5 in the chart. How many coins are there in the event?____ What is the number of possible outcomes? ____ Why are there only 4 possible outcomes?

8. Record the number of possible outcomes for each event in Questions 4 – 5.

9. If we list the possible outcomes for an event, we are giving all possible choices for a sample. This is called the_____.

10. Why is it important to list the sample space for an event?

Directions: Complete this page with your partner.

| Event	Sample Space	Number of Possible Outcomes
1. A cereal has five different shapes: star, heart, rainbow, shamrock, and circle.		
2. A set of ten number cards that are numbered 1 – 10		
3. A spinner has five equal sections. Two sections are red, one section is yellow, one is blue, and one is orange.		
4. A bag of tiles contains the letters that spell the word "OUTCOME."		
5. Four colored pens are on the desk. One is red, two are black, and one is blue.		

6. What do you notice about each of the sample spaces that you completed in the table?

7. Looking at the sample space, does it tell you the number of times a certain outcome appears?

8. What is the sample space for the third event?

9. Explain your answer for Question 8.

10. What other events are similar to the event in Question 3 where there are duplicate events possible in the sample space?

Directions: Complete this page with your teacher and partner.

Describe the favorable and total outcomes to create a fraction that will represent the desired outcome. Use colored pencils to shade the favorable outcomes.

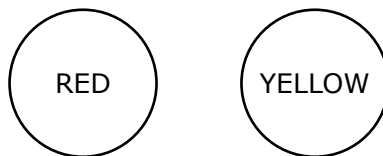**1.** A spinner with 4 equal spaces is shown below. The favorable outcome is blue.
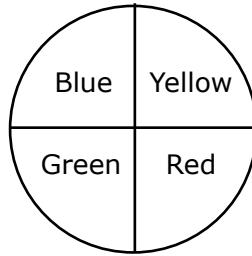
The favorable outcome is 1 blue section out of 4 total sections:

2. A fair number cube is rolled. The favorable outcome is a number less than 5.

The favorable outcomes are 4 shaded sections out of 6 total sections:

3. A colored counter is flipped. The favorable outcome is red.

The favorable outcome is the 1 red side out of 2 total sides:

A more common way to describe the "goal" of an event is to refer to it as a
_____ _____.

When you find the number of ways that a goal can be achieved and divide it by the total number of outcomes, you are finding the _____.

Directions: Complete this page with your teacher and partner.

Event	Favorable Outcome	Number of Favorable Outcomes	Number of Total Possible Outcomes	favorable outcome / total outcomes
1. A coin is flipped and will land on heads or tails.	heads			
2. A 6-sided number cube labeled 1 - 6 is rolled.	even number			
3. A spinner with 8 equal sections labeled 1 - 8 is spun.	number less than 3			
4. A bag of marbles contains 7 red, 6 green, and 8 blue marbles.	red marble			
5. A bag of change contains 4 nickels, 1 quarter, 5 dimes, and 15 pennies.	dime			

6. For Events 1 - 5, what two pieces of information did we use to create the fraction in the last column?

7. What do you notice about the way that the numerator is found in each fraction?

8. What do you notice about the way that the denominator is found in each fraction?

When you find the number of ways that a goal can be achieved and divide it by the total number of outcomes, you are finding the _____. The probability of an event can be written as a fraction of favorable outcomes over total outcomes.

Probability of an Event = $\frac{\text{favorable outcome}}{\text{total outcomes}}$ or can be written as

P(Event) = $\frac{\text{favorable outcome}}{\text{total outcomes}}$

Directions: Complete this page with your partner.

Event	Goal	Number of Total Possible Outcomes	Number of Favorable Outcomes	Probability *favorable outcomes* / *total outcomes*
1. A cereal has five different shapes: star, heart, rainbow, shamrock, and circle.	star			
2. A set of ten number cards are numbered 1 – 10.	odd number			
3. A spinner has five equal sections. Two sections are red, one section is yellow, one is blue, and one is orange.	red			
4. A bag of tiles contains the letters that spell the word "OUTCOME."	the letter "O"			
5. Four colored pens are in the desk. One is red, two are black, and one is blue.	black pen			

6. For Events 1 - 5, what two pieces of information did we use to determine the probability in the last column?

7. What do you notice about the way that the numerator is found in each fraction?

8. What do you notice about the way that the denominator is found in each fraction?

To find the probability of an event, we create a fraction with a numerator of the _____ and a denominator of the _____.

Directions: Complete this page with your teacher and partner.

A bag of marbles contains 3 red marbles, 15 green marbles, 10 blue marbles, and 2 yellow marbles. All the marbles have designs in them. Complete the table and the probability in the form of a fraction, a decimal, and a percent.

Problem	Probability (Fraction)	Probability (Decimal)	Probability (Percent)	Likelihood
A. What is the probability of picking a purple marble?				
B. What is the probability of picking a red or yellow marble?				
C. What is the probability of picking a green marble?				
D. What is the probability of picking a blue or green marble?				
E. What is the probability of picking a marble that has a design?				

Plot the probability of each event on the number line below and determine the likelihood of each event based on where it is plotted on the number line. Record the likelihood on the number line and in the graphic organizer.

0   0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1.0
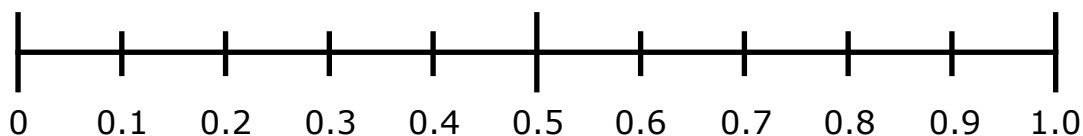
1. What is smallest value on the number line? _____.
What is the likelihood associated with this value? _____

2. What is the largest value on the number line? _____.
What is the likelihood associated with this value? _____

3. Based on the number line, what is the range for the probability of an event occurring? _____

Directions: Complete this page with your teacher and partner.

A bag of change contains 4 nickels, 1 quarter, 5 dimes, and 15 pennies.

1. What is the probability of choosing a nickel?

2. What is the probability of choosing a quarter?

3. What is the probability of choosing a dime?

4. What is the probability of choosing a penny?

5. What is the probability of choosing a nickel, quarter, dime, or penny?

The total of the probabilities for a specific sample space will always be equal to
_____.

Explain why.

A bag of change contains nickels, quarters, and dimes. The probability of choosing a nickel is $\frac{3}{8}$. The probability of choosing a dime is $\frac{1}{2}$. What is the probability of choosing a quarter?

6. Do we know how many of each coin is in the bag?

7. What is the total of the combined probabilities of choosing a nickel, a dime and a quarter? ____ Explain why.

8. What strategy can we use to determine the probability of choosing a quarter?

The probability of choosing a quarter is _____.

Directions: Complete this page with your partner.

A bag of marbles has 5 yellow marbles, 3 blue marbles, 6 red marbles, 4 green marbles, and 2 purple marbles.

1. What is the probability of choosing a yellow marble?

2. What is the probability of choosing a blue marble?

3. What is the probability of choosing a red marble?

4. What is the probability of choosing a green marble?

5. What is the probability of choosing a purple marble?

6. What is the probability of choosing a yellow, blue, red, green, or purple marble?

The total of the probabilities for a specific sample space will always be equal to ___.

Explain why.

A bag of marbles contains blue marbles, red marbles and green marbles. The probability of choosing a red marble is $\frac{1}{6}$. The probability of choosing a green is $\frac{1}{2}$. What is the probability of choosing a blue marble?

7. Do we know how many of each color marble is in the bag?

8. What is the total of the combined probabilities of choosing a red, green, and blue marble? ____ Explain why. _____

_____.

9. What strategy can we use to determine the probability of choosing a blue marble?

The probability of choosing a blue marble is _____.

Directions: Complete the following SOLVE problem with your teacher.

Josh and Daniel are playing a probability game in math class. Each of the boys rolls a fair number cube with the numbers 1, 2, 3, 4, 5, and 6 on the cube. Josh is trying to roll a number less than 3. Daniel is trying to roll an even number. If they each roll the number cube one time, which student is more likely to roll one of his numbers?

S Underline the question.
This problem is asking me to find _____

_____.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts.

L Write in words what your plan of action will be.

Choose an operation or operations.

V Estimate your answer.
Carry out your plan.

E Does your answer make sense? (Compare your answer to the question.)

Is your answer reasonable? (Compare your answer to the estimate.)
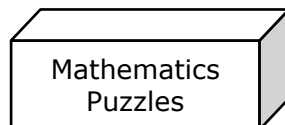
Is your answer accurate? (Check your work.)
Write your answer in a complete sentence.

Directions: Complete this page with your partner.

Use the information below to answer Questions 1 – 4.

The box below contains the letters in the words Mathematics Puzzles. Find the probability of drawing the following letters from the box.

Mathematics
Puzzles

1. What is the probability of drawing an "a"? What is the likelihood of this event?	**2.** What is the probability of drawing an "m" or an "s"? What is the likelihood of this event?
3. What is the probability of drawing a letter that is not an "o"? What is the likelihood of this event?	**4.** What is the probability of drawing a vowel? What is the likelihood of this event?

Directions: Answer Questions 5 - 8 regarding probability and likelihood of events.

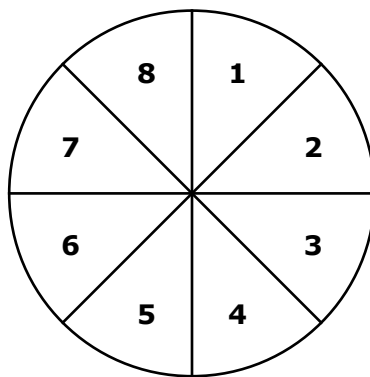| **5.** What is the probability of rolling a number less than 6 when rolling a fair number cube labeled 1 - 6? What is the likelihood of this event?	**6.** What is the probability of a coin landing on heads? What is the likelihood of this event?
7. What is the probability of choosing a blue marble from a bag containing 5 blue marbles, 6 green marbles, and 2 red marbles? What is the likelihood of this event?	**8.** What is the probability of rolling an odd number when rolling a fair number cube labeled 1 - 6? What is the likelihood of this event?

LESSON 32: Introduction to Probability

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Name _____   **Date** _____

Directions: Find the probability of the events for each problem using the spinner. Then write the likelihood of the event by labeling it as impossible, unlikely, equally likely, likely, or certain.

1. Probability of spinning a 1

2. Probability of spinning an odd number

3. Probability of spinning a number less than 3

4. Probability of spinning an even number

5. Probability of spinning a 1 or 2

6. Probability of spinning a 2, 5, or 7

7. Probability of spinning a number from 1 through 8

8. Probability of spinning a number greater than 3

9. Probability of spinning a number greater than 8

10. Probability of spinning a number greater than 2