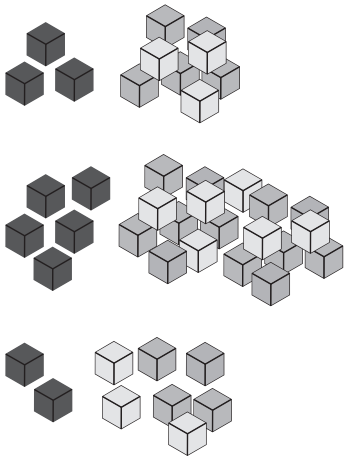
Name _____

**Use Centimeter Cubes to represent votes from a subgroup of a larger population. In the sample shown, the red cubes are modeled by the dark cubes and represent a *yes* vote. Record your results.**

**1.** Three samples are shown. Complete the table.



| Sample | Number of Votes | Number of *Yes* Votes | Number of *No* Votes |
|---|---|---|---|
| 1 | 11 | 3 | 8 |
| 2 | 23 | | |
| 3 | 9 | | |

How many votes were cast based on the samples?_____

How many votes were *yes*?_____

What percent of the votes cast were *yes* votes? _____

**Using Centimeter Cubes, represent votes from a subgroup of a larger population. Take three samples from a large pile of cubes. Choose a color to represent *yes* votes. Record your results.**

**2.**

| Sample | Number of Votes | Number of *Yes* Votes | Number of *No* Votes |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |

How many votes were cast based on the samples? _____

How many votes were *yes*?_____

What percent of the votes cast were *yes* votes?_____

**3.**

| Sample | Number of Votes | Number of *Yes* Votes | Number of *No* Votes |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |

How many votes were cast based on the samples? _____

How many votes were *yes*?_____

What percent of the votes cast were *yes* votes?_____

Name _____

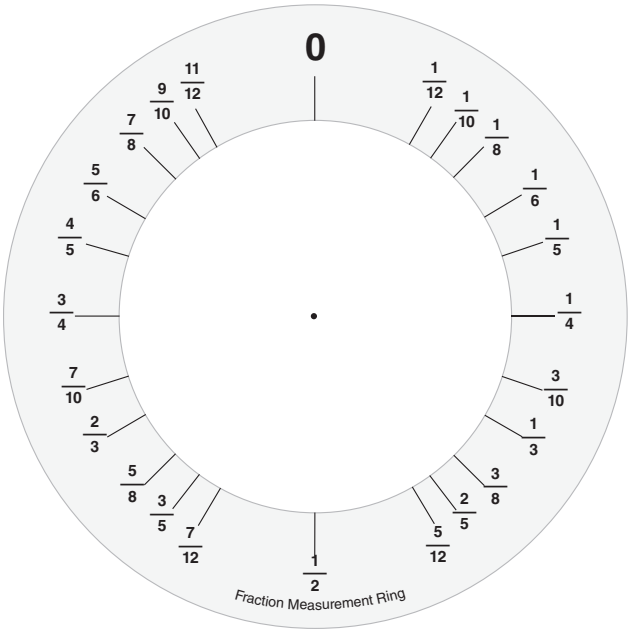
**Challenge!** Why it is necessary to use a sample when seeking results from a large poplulation?

Name _____

**Use Fraction Circles and the Measurement Ring to make a spinner for the probabilities given.**

**1.**

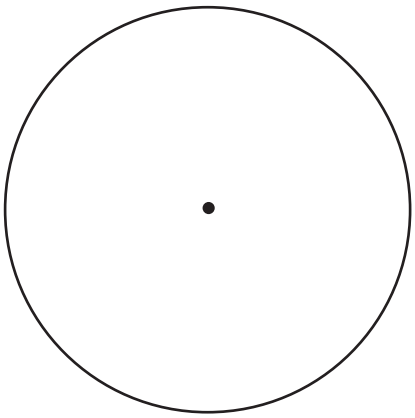
| Color | Probability |
|---|---|
| Black | $\frac{1}{12}$ |
| Gray | $\frac{2}{3}$ |
| White | $\frac{1}{4}$ |




**Using Fraction Circles and the Measurement Ring, make a spinner for the probabilities given.**

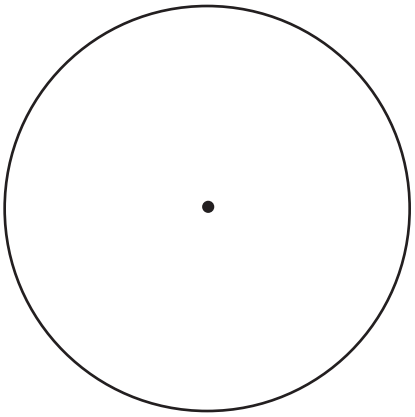
**2.**

| Pattern | Probability |
|---|---|
| dotted | $\frac{1}{4}$ |
| striped | $\frac{1}{8}$ |
| clear | $\frac{3}{8}$ |
| solid | $\frac{1}{4}$ |



**3.**

| Letter | Probability |
|---|---|
| A | $\frac{3}{10}$ |
| B | $\frac{2}{5}$ |
| C | $\frac{1}{10}$ |
| D | $\frac{1}{5}$ |



Name _____

**Challenge!** When making a spinner showing certain probabilities, what must the sum of the probabilities equal? Explain. Draw a picture to help.

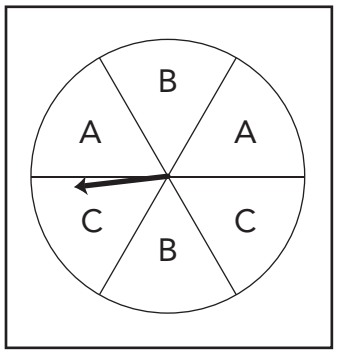
Name _____

**Use a spinner to model probability. Find each probability.**

**1.** *P*(B) _____

*P*(A) _____

*P*(C) _____



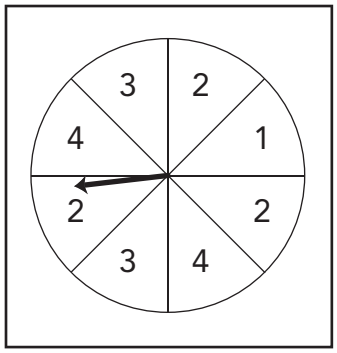

**Using a spinner, model each probability. Find each probability.**

**2.** *P*(1) _____

*P*(4) _____

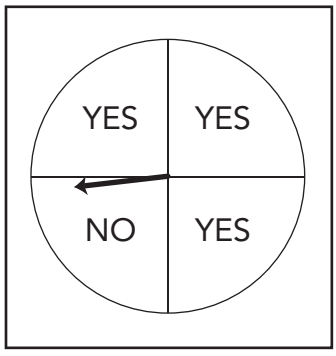
*P*(number < 5) _____

*P*(0) _____




**Find each probability**

**3.**

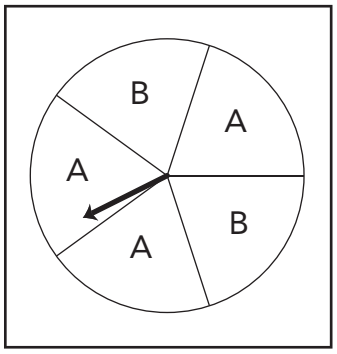



*P*(YES) _____

*P*(NO) _____

*P*(MAYBE) _____

**4.**




*P*(A) _____

*P*(B) _____

*P*(A or B) _____

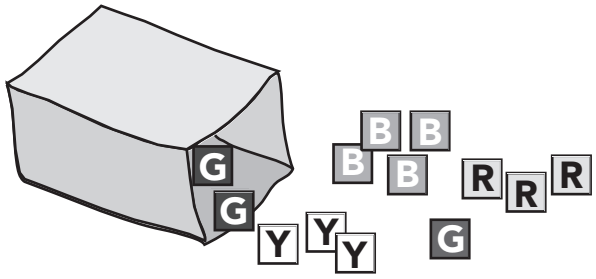
Name _____

**Challenge!** How do you use the number of sections in a spinner when finding the probability of an event?

Name _____

**Use Color Tiles to model a set with 3 yellow, 3 red, 4 blue, and 3 green. Find the probability of each event.**

**1.**




*P*( Y ) _____

*P*(not Y ) _____

*P*( Y or G ) _____

*P*( G or R ) _____

*P*(not G and not B ) _____

**Using Color Tiles, model the set described. Then find the probability of each event.**

**2.** Bag with 4 red tiles, 5 blue tiles, 6 green tiles, and 2 yellow tiles.

*P*(yellow or blue) _____

*P*(red) _____

*P*(green, red, or blue) _____

**3.** Bag with 5 red tiles, 3 blue tiles, and 3 yellow tiles.

*P*(not blue and not red) _____

*P*(yellow) _____

*P*(red or yellow) _____

**Find each probability given the set described.**

**4.** Bag with 10 red marbles, 12 blue marbles, 8 white marbles, 6 green marbles, and 4 yellow marbles.

*P*(not yellow) _____

*P*(not red and not white) _____

*P*(green or blue) _____

*P*(not green) _____

*P*(not green and not blue) _____

*P*(green) _____

**5.** Bag with 1 red marble, 1 blue marble, 1 white marble, 8 green marbles, and 10 yellow marbles.

*P*(blue) _____

*P*(red) _____

*P*(green) _____

*P*(white) _____

*P*(red, blue, white, green, or yellow) _____

*P*(not yellow) _____

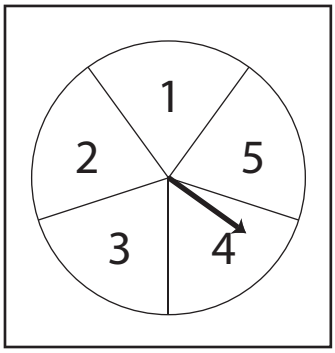
Name _____

**Challenge!** If you have 20 items in a set and 4 of the items are red, what do you know about the probability of red and the probability of not red? Show your work.

Name _____

**Use the spinner collection to model fair and unfair spinners. Find a spinner whose sections match each spinner below. Answer the questions.**

**1.**




Find $P(1)$. _____

Find $P(3)$. _____

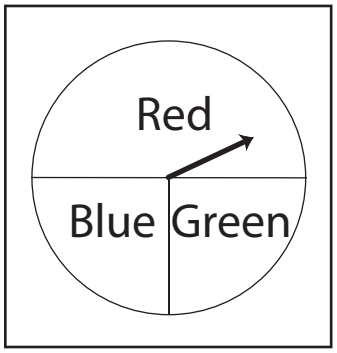
Find $P(4)$. _____

Is the spinner fair? _____

Why or why not? _____

_____

**2.**




Find $P(\text{red})$. _____

Find $P(\text{blue})$. _____

Find $P(\text{green})$. _____

Is the spinner fair? _____

Why or why not? _____

_____

**Using the spinner collection, model a fair and an unfair spinner. Sketch the models. Answer the questions.**

**3.** Sketch a fair spinner below.

Why is the spinner fair? _____

_____

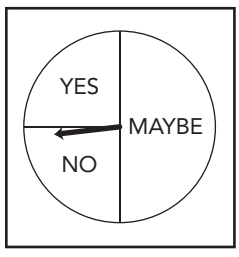
**4.** Sketch an unfair spinner below.

Why is the spinner unfair? _____

_____

**Determine if each spinner is fair. Explain your answer.**

**5.**

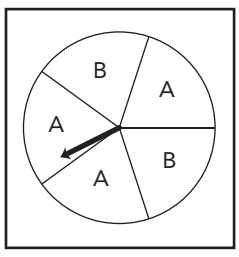



_____

_____

_____

**6.**

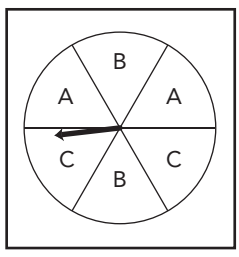



_____

_____

_____

**7.**




_____

_____

_____

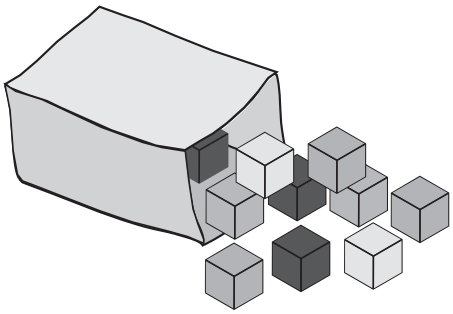
Name _____

**Challenge!** When a spinner has an odd number of equal-sized sections and the sections are not uniquely labeled, how can you be certain that the spinner is not fair? Are there any odd numbers for which the spinner could be fair? Explain or draw an example.

Name _____

**Use Centimeter Cubes to model the probability of each event, without replacement. Make a bag like the one shown. Answer the questions.**

**1.** The bag has 2 yellow cubes, 5 green cubes, and 3 red cubes.



What is the probability of selecting a yellow cube at random? _____

Without replacing the yellow cube, what is the probability of selecting a red cube at random?

_____

What is *P*(yellow, red)? _____

What is *P*(yellow, yellow)? _____

**Using Centimeter Cubes, model each bag described. Find each probability without replacement.**

**2.** A bag with 5 black cubes, 3 pink cubes, and 2 blue cubes

What is *P*(blue, black)? _____

What is *P*(pink, blue)? _____

What is *P*(black, black)? _____

**3.** A bag with 6 orange cubes, 6 red cubes, and 6 brown cubes

What is *P*(orange, red)? _____

What is *P*(red, red)? _____

What is *P*(brown, red)? _____

**Find each probability without replacement.**

**4.** A bag with 5 black marbles, 2 white marbles, and 8 yellow marbles

What is *P*(yellow, white)? _____

What is *P*(white, black)? _____

What is *P*(black, black)? _____

What is *P*(black, yellow)? _____

**5.** A bag with 3 solid ribbons, 4 striped ribbons, and 10 checkered ribbons

What is *P*(solid, solid)? _____

What is *P*(checkered, striped)? _____

What is *P*(striped, solid)? _____

What is *P*(solid, checkered)? _____

**6.** A bag with 12 red tiles, 10 black tiles, and 20 white tiles

What is *P*(red, white)? _____

What is *P*(white, black)? _____

What is *P*(red, black)? _____

What is *P*(black, black)? _____

**7.** A bag with 10 green marbles, 2 clear marbles, and 8 blue marbles

What is *P*(clear, clear)? _____

What is *P*(green, clear)? _____

What is *P*(blue, green)? _____

What is *P*(green, green)? _____

Name _____

**Challenge!** Describe the numbers you multiply in the denominator when you find the probability of two events without replacement. When does the probability in simplest form have a denominator that differs from the product of the numbers you just described?

Name _____

**Use a 4-sided die and a 6-sided die to make a table of products when the dice are rolled. Use the table to find each probability.**

**1.**

| × | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | 2 | 4 | 6 | 8 | 10 | 12 |
| 3 | 3 | 6 | 9 | 12 | 15 | 18 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 |

*P*(multiple of 6) _____

*P*(multiple of 4) _____

*P*(even product) _____

*P*(multiple of 10) _____

**Using Polyhedral Dice, make a table to find each probability.**

**2.** two 4-sided dice

*P*(multiple of 3) _____ *P*(product that is a prime number) _____

*P*(product < 15) _____ *P*(multiple of 8) _____

**3.** 6-sided die and 10-sided die

*P*(odd product) _____ *P*(product > 40) _____

*P*(product < 10) _____ *P*(multiple of 5) _____

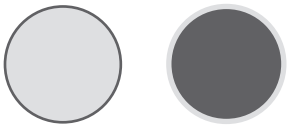
Name _____

**Challenge!** An experiment has you roll an 8-sided die and a 12-sided die and multiply the face values of the dice. What is the number of outcomes for this experiment? What is the smallest product in the table? What is the largest product in the table? How many products are less than 10?

Name _____

**Use the decahedral die and a Two-Color Counter to model each probability. Find the probability of each compound event.**

**1.** 10-sided die numbered 0 to 9 and 1 Two-Color Counter

*P*(1 and red) _____

*P*(8 and red) _____

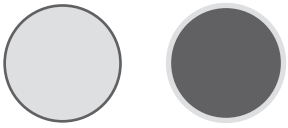
*P*(4 and not yellow) _____

*P*(6 and yellow) _____

*P*(7 or 8 and red) _____

**Using a die and a Two-Color Counter, model each probability. Find each probability.**

**2.** 20-sided die numbered 1 to 20 and 1 counter

*P*(1 and yellow) _____

*P*(12 and red) _____

*P*(4, not red) _____

**3.** 6-sided die numbered 1 to 6 and 1 counter

*P*(2 and red or yellow) _____

*P*(2 and yellow) _____

*P*(not 3, red) _____

*P*(not 4 or 5, yellow) _____

**Find each probability.**

**4.** 8-sided die numbered 1 to 8 and 1 counter

*P*(1 and yellow) _____

*P*(7, not red) _____

*P*(not 9, not yellow) _____

*P*(5 or 6, red) _____

**5.** 12-sided die numbered 1 to 12 and 1 counter

*P*(12 and yellow) _____

*P*(13 and red) _____

*P*(not 1, not yellow) _____

*P*(4 and red or yellow) _____

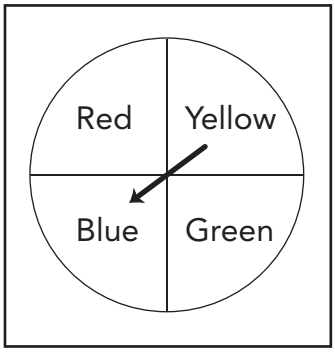
Name _____

**Challenge!** What does the word *compound* mean when finding the probability of an event?

Name _____

**Use the 4-section color spinner and a number cube to simulate a game. Make a tree diagram for all possible outcomes. Find each probability.**

**1.** Four-section spinner with red, blue, green, and yellow sections and a number cube labeled 1 to 6





*P*(red and 1) _____ *P*(green and an even number) _____

**Using the 6-section color spinner and a coin, make a tree diagram of all possible outcomes. Find each probability.**

**2.**

*P*(yellow and heads) _____ *P*(blue or green and heads) _____

**Find each probability given the two elements of chance.**

**3.** 2 coins

*P*(two heads) _____

*P*(heads and tails) _____

**4.** 8-sided die labeled 1–8 and a coin

*P*(8 and heads) _____

*P*(tails and odd) _____

**5.** two-section spinner labeled red and blue, and a 4-sided die labeled 1–4

*P*(blue and 3) _____

*P*(red and even) _____

Name _____

**Challenge!** Describe a tree diagram for three items of chance: coin, 4-section spinner, and a number cube. Does the number of possible outcomes vary depending on the order in which you make your diagram? Explain.