12.1 Start Thinking

Last season's basketball uniforms were stored in two boxes. One box contains 15 numbered jerseys; the other contains the matching numbered shorts. Your coach tells you to grab a jersey from one box and a pair of shorts from the other box. All 15 players grab a jersey from the first box.

1. You are the first one to reach into the box of shorts. You grab the first pair of shorts you touch. How likely is it that you will grab the number that matches your jersey?

2. Assuming the 15 uniforms are numbered 1 to 15, list all the possible outcomes for your uniform if your jersey is number 11.

12.1 Warm Up

List the possible outcomes for the situation.

1. tossing a coin three times

2. spinning a spinner twice that contains four equally likely colors—blue, red, yellow, and green

3. spinning the spinner mentioned in Exercise 2 followed by tossing a coin

12.1 Cumulative Review Warm Up

Let θ be an acute angle of a right triangle. Evaluate the other five trigonometric functions of θ.

1. $\sin \theta = \dfrac{4}{7}$ **2.** $\cos \theta = \dfrac{8}{9}$ **3.** $\tan \theta = \dfrac{5}{4}$

4. $\csc \theta = \dfrac{8}{3}$ **5.** $\cot \theta = \dfrac{3}{4}$ **6.** $\sec \theta = \dfrac{9}{5}$

Name _____ Date _____

In Exercises 1 and 2, find the number of possible outcomes in the sample space. Then list the possible outcomes.

1. You flip three coins.

2. A clown has three purple balloons labeled a, b, and c, three yellow balloons labeled a, b, and c, and three turquoise balloons labeled a, b, and c. The clown chooses a balloon at random.

3. Your friend has eight sweatshirts. Three sweatshirts are green, one is white, and four are blue. You forgot your sweatshirt, so your friend is going to bring one for you as well as one for himself. What is the probability that your friend will bring two blue sweatshirts?

4. The estimated percentage student GPA distribution is shown. Find the probability of each event.

GPA Distribution

3.5-3.7: 12%
3.8-4.0: 7%
<1.0: 6%
1.0-1.9: 9%
3.0-3.4: 25%
2.0-2.9: 41%
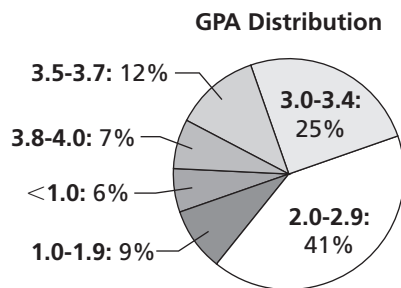
   a. A student chosen at random has GPA of at least 3.0.

   b. A student chosen at random has GPA between 1.0 and 2.9, inclusive.

5. A bag contains the same number of each of four different colors of marbles. A marble is drawn, its color is recorded, and then the marble is placed back in the bag. This process is repeated until 40 marbles have been drawn. The table shows the results. For which marble is the experimental probability of drawing the marble the same as the theoretical probability?

Drawing Results			
yellow	red	blue	black
12	10	7	11

12.1   Practice B

In Exercises 1 and 2, find the number of possible outcomes in the sample space. Then list the possible outcomes.

1. You roll a die and draw a token at random from a bag containing three pink tokens and one red token.

2. You draw 3 marbles without replacement from a bag containing two brown marbles and three yellow marbles.

3. When two six-sided dice are rolled, there are 36 possible outcomes.

    a. Find the probability that the sum is 5.

    b. Find the probability that the sum is not 5.

    c. Find the probability that the sum is less than or equal to 5.

    d. Find the probability that the sum is less than 5.

4. A tire is hung from a tree. The outside diameter is 34 inches and the inside diameter is 14 inches. You throw a baseball toward the opening of the tire. Your baseball is equally likely to hit any point on the tire or in the opening of the tire. What is the probability that you will throw the baseball through the opening in the tire?

In Exercises 5–7, tell whether the statement is *always*, *sometimes*, or *never* true. Explain your reasoning.

5. If there are exactly five possible outcomes and all outcomes are equally likely, then the theoretical probability of any of the five outcomes occurring is 0.20.

6. The experimental probability of an event occurring is equal to the theoretical probability of an event occurring.

7. The probability of an event added to the probability of the complement of the event is equal to 1.

8. A manufacturer tests 900 dishwashers and finds that 24 of them are defective. Find the probability that a dishwasher chosen at random has a defect. An apartment building orders 40 of the dishwashers. Predict the number of dishwashers in the apartment with defects.

12.1 Enrichment and Extension

Sample Spaces and Probability

The diagram at right shows a method of graphically recording
the results of 12 coin tosses that occur in one-second intervals.
The horizontal axis shows time t and the vertical axis shows
position s. Beginning at the origin, the graph moves one
unit up to record "heads" and one unit down to record "tails."
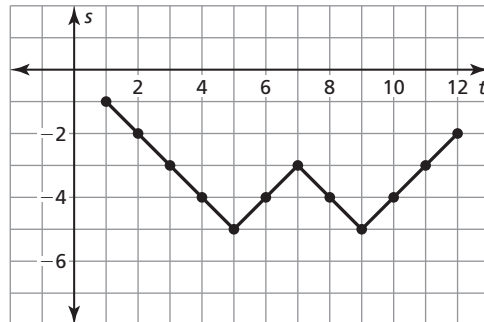
This type of graph is called a *random walk*. Random walks
are mathematical formalizations of paths that consist of
successions of random steps. Other examples include tracing
the path of a molecule as it travels in a liquid or gas, or the
price of a fluctuating stock.

1. Using H for "heads" and T for "tails," write the sequence for the random
   walk shown above.

Graph the random walk for the given coin sequences A, B, and C.

2. A: H, H, H, H, T, T, T, H, T, H, T, T, T, T, H

3. B: T, T, H, T, T, H, H, T, H, T, T, H, H, H, H

4. C: H, H, H, H, T, T, H, T, T, H, H, H, T, T, T

**Refer to the graphs of sequences A, B, and C. For each sequence, give the time,
if it exists, at which the random walk first returns to position $s = 0$. Then give
the amount of time that the random walk spends in the first quadrant.**

5. Sequence A 6. Sequence B 7. Sequence C

8. With a partner, toss a coin 20 times to generate a random walk. Generate
   5 such walks.

   a. In what percent of your walks do you return to position $s = 0$ during
      the walk?

   b. What is the average number of tosses to return to position $s = 0$?

9. Give an example of a real-life situation for which a random walk would be
   an appropriate model. How are these models helpful when analyzing data?

Name_____ Date _____

12.1 Puzzle Time

What Happens When You Throw A Clock In The Air?

Write the letter of each answer in the box containing the exercise number.

Find the number of possible outcomes in the sample space.

1. You roll a die and flip two coins.

2. You draw two marbles without replacement from a bag containing four red marbles, two yellow marbles, and five blue marbles.

3. You flip six coins.

4. A bag contains eight black cards numbered 1 through 8 and six red cards numbered 1 through 6. You choose a card at random.

Find the probability.

5. You draw a number card from a standard deck of cards.

6. When two six-sided dice are rolled, there are 36 possible outcomes. Find the probability that the sum is less than 5.

7. In a classroom of 20 students, 12 students have brown hair, 4 students have blonde hair, 3 students have red hair, and one student has black hair. Find the probability of randomly selecting a blonde haired student from the classroom.

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Answers

P. $\dfrac{1}{5}$

T. 24

E. 14

S. $\dfrac{9}{13}$

I. 40

M. 64

U. $\dfrac{1}{6}$

</div>

1	2	3	4	5		6	7