NAME

Module 20 Solving Problems Using Probability, Statistics, and Discrete Math
Lesson 2 Solving Basic Probability Problems

The table below shows the results of three students repeatedly flipping a fair quarter. Each student noted the number of times heads and tails appeared. Use the table to answer questions 1–6.

	Heads	Tails	Number of Trials
Bill	50	30	80
Fushia	248	252	500
Andrew	2	4	6

1. Use Bill's results to calculate the experimental probability of getting tails.
$\frac{3}{8}$

2. Use Fushia's results to calculate the experimental probability of getting tails.
$\frac{63}{125}$

3. Use Andrew's results to calculate the experimental probability of getting tails.
$\frac{2}{3}$

4. What is the theoretical probability of flipping the quarter and getting tails?
$\frac{1}{2}$

5. Convert each answer in Question #1–4 to a decimal rounded to the nearest thousandth.

0.375, 0.504, 0.667, 0.5

6. Who had an experimental probability that was closest to the theoretical probability of getting tails? What would be a reason for that person's probability to be the closest?

Fushia's probability was the closest. Hers was probably closest because she flipped the coin the most: 500 times.

Michelle has a cooler with 60 sodas. The sodas include 14 diet sodas, 10 orange sodas, six ginger ales, and 30 other types of soda. Michelle will reach in the cooler and randomly pick one soda to drink. Find each probability below.

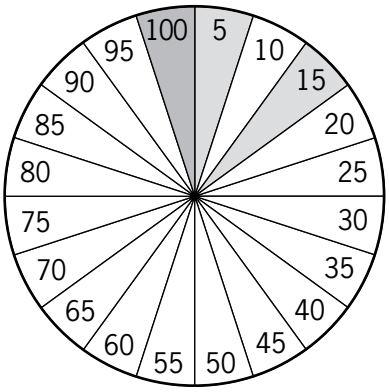
7. P(diet soda) $\frac{7}{30}$

8. P(not ginger ale) $\frac{9}{10}$

9. P(orange or ginger ale)
$\frac{4}{15}$

10. P(other than diet, orange, or ginger ale)
$\frac{1}{2}$

On the game show Guess-the-Price contestants spin "The Large Wheel." The wheel is divided into twenty equally sized sections and is numbered with multiples of five from five to 100. The numbers five and 15 are green, the number 100 is red, and all other numbers are white. Find each probability below.



11. P(50)
$\frac{1}{20}$

12. P(odd)
$\frac{1}{2}$

13. P(green number)
$\frac{1}{10}$

14. P(red number)
$\frac{1}{20}$

15. P(number greater than three)
1

16. P(number less than 80)
$\frac{3}{4}$

17. P(green number or white number)
$\frac{19}{20}$

18. P(red number or odd number)
$\frac{11}{20}$

Journal

1. Explain to a friend the Law of Large Numbers.
2. Describe an event that has a probability of one. How do you know you are right?
3. Describe an event that has a probability of zero. How do you know you are right?
4. Explain why the probability of an event *not* happening is one minus the probability of the event happening.

Cumulative Review

Solve each equation for *b*.

1. $c = 2b$

$b = \frac{c}{2}$

2. $c = 3b + 6$

$b = \frac{c - 6}{3} = \frac{c}{3} - 2 = \frac{1}{3}c - 2$

3. $4 = \frac{2ab}{c}$

$b = \frac{2c}{a}$

4. $c = b^2 + 5$

$b = \sqrt{c - 5}$ or $b = -\sqrt{c - 5}$

5. A local bakery sells muffins for $1.50 each and cookies for $0.50 each. On Monday, the bakery sold 10 more muffins than cookies for a total of $215.00. How many cookies did the bakery sell?

100 cookies

6. Maggie invested $10,000. She invested some of the money in an account that earned 3% annual interest and the rest in an account that earned 5% annual interest. After a year, Maggie earned $370 in interest. How much did she invest at 5%?

$3,500

7. Two cars start at the same house and drive along the same path. One car travels at a constant rate of 65 kilometers per hour while the other travels at a constant rate of 61 kilometers per hour. After how many hours will the two cars be 10 kilometers apart?

2.5 hours

Possible Journal Answers

1. **The more times an experiment is conducted, the closer the experimental probability will be to the theoretical probability. For example, the more times a coin is flipped, the more likely that the number of heads one gets equals one-half the total number of flips.**
2. **Any event that is certain to happen is a correct answer. For example, "the probability that a week has seven days" has a probability of one because it will definitely happen.**
3. **Any event that is certain not to happen or is impossible is a correct response. For example, "the probability that a week has twelve days" has a probability of zero because it will definitely not happen.**
4. **Either an event happens or it doesn't happen. There are no other possibilities. Therefore, the sum of the probability that an event happens and the probability that an event does not happen must equal one. For example, the probability of rolling a six on one die is $\frac{1}{6}$. The probability of rolling a number other than six (not a six) is $1 - \frac{1}{6} = \frac{5}{6}$.**