Introduction to Probability

Use What You've Learned
Answers and Explanations

The following problems require you to make and use a spinner like the one shown in the video. If you completed *Problems from the Video*, use the data you already collected and skip to problem 2.

1. Determine the probability of spinning each number on the spinner by conducting an experiment.
   a. Using sturdy paper, print the spinner shown on page 3.
   b. Insert a brad through a paperclip and then through the center of the spinner. Adjust the brad in order to make the paperclip spin freely.
   c. Spin the paperclip 100 times and record the results in the table below by making a tally mark for each spin.
   d. After spinning 100 times, count and record the total number of spins for each number.
   e. Determine the experimental probability of each event and record it in the table.

Event	Spins out of 100 (tally)	Spins out of 100 (total)	Experimental Probability
1			
2			
3	*Answers will vary.*		
4			
5			

2. The following table shows the results of spinning the spinner 100 times as seen in the video. Compare your results to the video results. Are they the same? Does this surprise you? Explain your reasoning.

Event	Spins out of 100 (total)	Experimental Probability
1	36	$\frac{36}{100}$ or 36%
2	19	$\frac{19}{100}$ or 19%
3	23	$\frac{23}{100}$ or 23%
4	8	$\frac{8}{100}$ or 8%
5	14	$\frac{14}{100}$ or 14%

Your results may be similar to those in the video but will probably not be exactly the same.

You cannot predict exactly how many times you will spin each number whether you spin the spinner one time or 100 times. If you spin a large number of times, however, you can expect your results to be close to the theoretical probability. The greater the number of spins, the closer the experimental probability will be to the theoretical probability. Similarily, results of two experiments will be closer with a greater number of spins.

3. The following table shows the theoretical probability of spinning each number. Explain how to determine each of these theoretical probabilities.

Event	Theoretical Probability
1	$\frac{4}{10}$ or 40%
2	$\frac{2}{10}$ or 20%
3	$\frac{2}{10}$ or 20%
4	$\frac{1}{10}$ or 10%
5	$\frac{1}{10}$ or 10%

The spinner is divided into 10 equal sectors, so there are 10 equally likely outcomes. The probability of landing on any one of the 10 sectors is 10%. Since there are four sectors labeled 1, the probability of spinning 1 is 40%. Likewise, there are two sectors labeled 2 and two sectors labeled 3, so the probability of spinning each number is 20%. Only one sector is labeled 4 and only one sector is labeled 5, so the probability of spinning each number is 10%. Notice that the sum of the probabilities equals 100% (40% + 20% + 20% + 10% + 10%). There is a 100% chance that you will land on one of the numbers when you spin the spinner.

Candy, Hank, and Tom are playing Probability Path. Each of their markers is shown on the game board below. Determine the theoretical probability of each of the following events.

4. What is the probability that Candy will lose her turn on her next spin?
   If Candy spins a 1, she will lose her turn.
   P (1) = $\frac{4}{10}$ or 40%

5. What is the probability that Hank will lose his turn on his next spin?
   If Hank spins a 5, he will lose his turn.
   P (5) = $\frac{1}{10}$ or 10%

6. What is the probability that Hank will **not** win on his next spin?
   Hank needs to spin a 7 or greater in order to win, so it is certain that he will not win on his next spin. P = 1 or 100%

7. What is the probability that Tom will **not** have to go back 10 spaces?
   If Tom spins a 1, he will have to go back 10 spaces. Since, P (1) = 40%,
   P (not 1) = 60%.

8. What is the probability that Tom will win on his next turn?
   Tom needs to spin a 9 or greater in order to win, so it is impossible for him to win on his next turn. P = 0 or 0%