2 Review

2.1 Probability Experiments, pages 60–67

1. In Tim's coffee shop, a study was done to see how many people buy coffee and a doughnut. Of 160 people who came in one day, 60 bought coffee *and* a doughnut. The rest bought coffee *or* a doughnut. Find the experimental probability that the next person will buy both coffee and a doughnut.

a) as a fraction in lowest terms

b) as a percent

c) as a decimal

2. Complaints were made to a manufacturer about malfunctioning computer chips. The company promptly tested 10 different chips from the production line and found them all to be working properly.

a) Does this mean the chips are likely all working properly? Explain.

b) How could the company do better quality control?

2.2 Theoretical Probability, pages 68–75

3. From a standard deck of 52 playing cards plus two jokers, find the probability of each event. Express each answer as a fraction in lowest terms.

a) a red card

b) a black face card

c) an ace, 2, or 3

d) a red card that is not a face card

4. Two dice are rolled. Find the probability that the sum of the numbers is

a) 11

b) not 11

c) 2, 3, or 4

d) a multiple of 3

e) greater than 1

f) greater than 3

5. Matthew has black socks, white socks, blue jeans, dress pants, a red shirt, a green shirt, and a T-shirt.

a) Draw a tree diagram showing his choices for socks, pants, and shirt.

b) Find the probability that Matthew selects at random

i) blue jeans and the T-shirt

ii) white socks

iii) black socks, dress pants, and a red shirt

iv) white socks and not the T-shirt

2.3 Compare Experimental and Theoretical Probabilities, pages 76–85

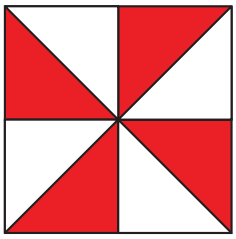
6. Two dice were rolled 20 times. Doubles were rolled five times.

a) Find the experimental probability of rolling doubles. Express your answer as a percent.

b) If you were to roll the dice 20 more times, would you expect five doubles again? Explain.

c) If you were to roll the dice 20 times, how many doubles would you theoretically expect? Justify your answer.

7. The figure shows a unique dartboard.



a) For a randomly thrown dart, what is the theoretical probability of landing on red? Explain your reasoning.

b) During a game of darts, 32 out of 40 landed on red. Determine the experimental probability of landing on red, expressed as a decimal.

c) In the game in part b), two points were awarded for landing on red and one point for landing on white. How might this explain the difference between experimental and theoretical probability?

8. You perform the command **randInt(1,5,10)** on a graphing calculator.

a) Describe what will happen.

b) How many 2s would you expect to be among the results? Explain your reasoning.

9. You perform the **rand** function on a graphing calculator.

a) Describe what will happen.

b) If you performed this command 20 times, how many of the results would you expect between 0.2 and 0.7? Explain your reasoning.

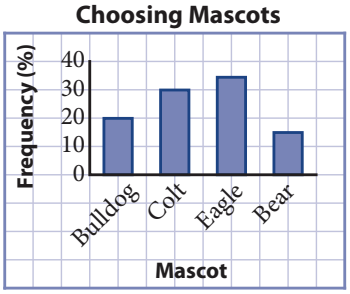
2.4 Interpret Information Involving Probability, pages 86–93

10. A basketball player made 40 out of 50 free throws in last week's games.

a) Find the player's free-throw percentage.

b) If the player averages eight free throws per game, how many of them should she expect to make?

11. The school council at Jackson Secondary School surveyed the students to help select a new football team mascot. The results are shown in the graph.



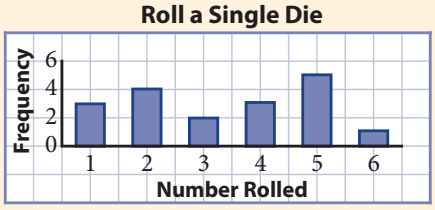
a) If 80 students were surveyed, how many of them voted for a bulldog?

b) Johnson Secondary School has an eagle as their mascot, so those at Jackson Secondary who chose an eagle are asked to vote for another animal instead. What is the probability that a person who originally voted for an eagle will now vote for a bear?

2 Practice Test

For questions 1 to 3, choose the best answer.

1. During a probability experiment, a die was rolled 18 times. The results are shown in the bar graph.



The experimental probability of rolling a 2 is

A $\frac{1}{6}$ **B** $\frac{2}{18}$ **C** $\frac{2}{9}$ **D** 16.7%

2. The theoretical probability of rolling a 6 is

A $\frac{1}{6}$ **B** $\frac{1}{18}$ **C** $\frac{1}{3}$ **D** 0

3. To simulate guessing on 10 multiple-choice questions, each with four possible answers, it would be appropriate to use:

A 10 spins on a spinner divided into quarters, each quarter of a different colour

B **randInt(1,4,10)** on a graphing calculator

C drawing and replacing 10 playing cards from a standard deck of cards

D any of these methods

4. True or false?

When rolling two dice, the sums 2 through 11 are all equally likely.

5. Richie Rich has a limousine, a sports car, and a motorcycle for travelling from his condominium to the airport. There, he has a helicopter and a jet for flying to his favourite golf courses.

a) Draw a tree diagram, showing his choices for the two stages of his trip to play golf.

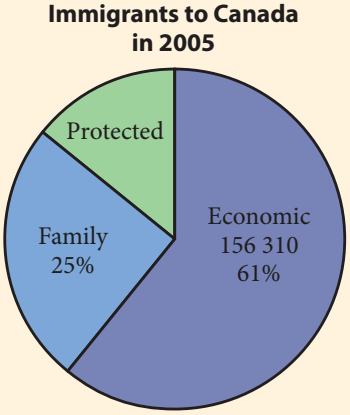
b) Find the probability that he randomly:

i) takes the sports car then his helicopter

ii) does not take his limousine

iii) takes the sports car or motorcycle and the jet

6. Immigrants come to Canada for a variety of reasons. A report from Citizenship and Immigration Canada divides the reasons into three categories: business/economic, family, and protected persons. In 2005, there were 256 246 new immigrants.



a) Find the number of people in the "family" and "protected" categories.

b) If an immigrant to Canada does not fall into the "protected" category, find the probability, as a percent, that he or she came to Canada for business/economic reasons.

Chapter Problem Wrap-Up

The government and anglers have a keen interest in protecting Ontario's waterways and fish stocks. Sometimes, species are endangered due to overfishing or to the introduction of invasive species. Search the media or the Internet to find statistics on declining fish stocks or increasing invasive species in Ontario (or Canadian) waters. Write a brief report on your findings.

Write a concluding statement that uses probability to describe the future of a particular fish stock or effects on the fishing industry.

7. If a farmer waits one week to sell his corn, there is a 50% chance that he will earn an extra $10 000. However, there is a 10% chance that he will lose $30 000. Should he sell now, or wait one week?

a) Describe how you could use a spinner to perform a probability experiment to simulate this situation.

b) Describe how you could use the **rand** command on a graphing calculator to perform the same probability experiment.

c) Use either a spinner or a graphing calculator for 25 trials. Each time, record whether the farmer gained $10 000, lost $30 000, or neither. Calculate the average amount the farmer will lose or gain if he waits one week to sell his corn.

8. A spinner is designed for three outcomes. The blue outcome is twice as likely as the red, while the yellow is three times as likely as the blue.

a) Find the measures of the three angles required to make this spinner.

b) For this spinner, find the theoretical probability of

i) landing on red

ii) not landing on red

c) Describe how the command **randInt(1,9,1)** can simulate spinning red, yellow, or blue.

d) Perform the **randInt(1,9,1)** command 20 times, each time recording whether it indicates red, blue, or yellow. How many times did red occur twice in a row? How many times did yellow occur twice in a row?

e) Find the theoretical probability of yellow occurring twice in a row. Hint: Part d) will provide an estimate, which can be improved upon if you perform more than 20 trials. You might also try drawing a tree diagram.