

Extra Practice 1A**Lesson 7.1: Mean and Mode**

1. Calculate the mean for each data set below.
Write each answer to the nearest whole number.

- a) 9, 5, 3, 10, 8, 7, 7, 6
- b) 22, 26, 18, 21
- c) 15, 14, 13, 12, 11, 10, 9, 8, 7
- d) 92, 85, 94, 88, 75, 78

2. Find the mode for each data set below.

- a) 9, 12, 13, 12, 10, 7, 12, 9, 14, 8
- b) 32, 40, 34, 36, 42, 34, 44, 34
- c) 98, 76, 56, 75, 76, 88, 76, 30
- d) 7, 7, 9, 10, 7, 8, 8, 9, 7, 7, 6, 11

3. This table shows the statistics for the goalies in a house league for hockey.

Goalie	Games Played	Shutouts	Goals Against
Foxx	64	7	97
Grey	61	10	117
White	57	3	123
Hawk	56	6	112
Payne	47	2	123
Ottawa	45	8	82

- a) Write each answer to the nearest whole number.
Calculate the mean for each of the following:
 - Games Played
 - Shutouts
 - Goals Against
- b) Find the mode for each of the following:
 - Games Played
 - Shutouts
 - Goals Against
- c) Who do you think is the best goalie?
Explain.

Extra Practice 2A**Lesson 7.2: Median and Range**

1. Find the median and range of each set of data.
 - a) 63, 48, 78, 42, 88, 78, 72
 - b) 24, 68, 34, 50, 90, 32, 42, 48
 - c) 60, 52, 212, 142, 492, 37
 - d) 49, 57, 76, 36, 48, 52, 54, 97, 72, 51

2. The Parks and Recreation department hired 8 summer camp counsellors. Their weekly pay was:
\$280, \$420, \$325, \$360, \$290, \$375, \$365, \$295
 - a) Find the range of weekly pay.
 - b) What is the median pay?

3.
 - a) Write a set of 5 numbers with median 21.
 - b) Write a set of 10 numbers with median 30.
 - c) Write a set of 8 numbers with median 20, and range 10.

4. You are given a set of 20 numbers.
Describe how you would find the median.

5. Create a problem that goes with this set of data.
Answer your problem.
28, 22, 37, 40, 34, 44, 37

6. Eight people applied for a job at the market.
The median age was 23, and the mode age was 25.
What might the ages be?
How do you know?

Extra Practice 3A

Lesson 7.3: The Effects of Outliers on Average

1. The following data represent daily library use during a 2-week period.
172, 422, 248, 253, 236, 392, 324, 212, 274, 231, 307, 253
 - a) Calculate the mean, median, and mode.
 - b) Identify the outliers.
 - c) Calculate the mean, median, and mode without the outliers.
How is each measure of central tendency affected when the outliers are not included?

2. Here are the tips earned by the servers at a restaurant:
\$55, \$48, \$34, \$60, \$63, \$42, \$48, \$98, \$20
 - a) Determine the measures of central tendency.
 - b) Identify the outliers.
How do the outliers affect the mean, median, and mode?
 - c) Suppose the restaurant manager is hiring new servers.
Should the outliers be included when the manager interviews new candidates and reports the average tips earned? Explain.

3. Is each conclusion correct? Explain.
 - a) The mode size of men's hiking boots sold in a particular week was 8.5.
So size 8.5 was sold more than any other size that week.
 - b) The mean number of students who have breakfast each day is 312.
So, the highest number of students who might have had breakfast today is 312.

4. Grade 7 band students were asked how much time they spent practising on the weekend.
The results, in minutes, are shown.
65, 15, 0, 45, 50, 50, 70, 75, 50, 35, 35, 45, 40, 40, 30, 75, 120, 40, 60, 40
 - a) Calculate the mean, median, and mode times.
 - b) Identify the outliers.
How do the outliers affect the mean, median, and mode?
 - c) Should the outliers be included when reporting the average time spent practising? Explain.

Extra Practice 4A**Lesson 7.4: Applications of Averages**

1. Here are a student's game scores for a trivia contest:
860, 856, 876, 860, 838, 854, 872, 861, 874, 878, 864
 - a) Find the mean, median, and mode of these data.
 - b) Of the mean, median, and mode, which do you think best describes the data? Explain.
 - c) What is the range of these data?
 - d) What score must the student get in the 12th stage of the contest so that the mean score is 860?
Is this possible? Explain.

2. A quality control inspector randomly selects boxes of pasta from the production line.
On one day she measures the masses of 40 boxes, and finds:
 - 11 boxes have mass 498 g
 - 12 boxes have mass 500 g
 - 1 box has mass 502 g
 - 10 boxes have mass 503 g
 - 6 boxes have mass 505 g
 - a) Write an expression that can be used to calculate the mean mass.
 - b) Find the mean, median, and mode mass.
 - c) For the shipment of pasta to be acceptable, the mean mass must be greater than 500 g. Is this shipment acceptable? Explain.
 - d) Suppose the inspector selects 5 more boxes, each with the same mass. The mean mass of the 45 boxes is now 500.8 g.
What is the mass of each of the 5 new boxes?

Extra Practice 5A**Lesson 7.5: Different Ways to Express Probability**

1. The lost and found box in the school office holds 7 red gloves, 8 red mittens, 9 black gloves, 5 grey gloves, and 6 grey mittens.
You pick one item without looking.
Find the probability of choosing:
 - a) a red glove
 - b) any glove
 - c) a black glove
 - d) a grey mitten

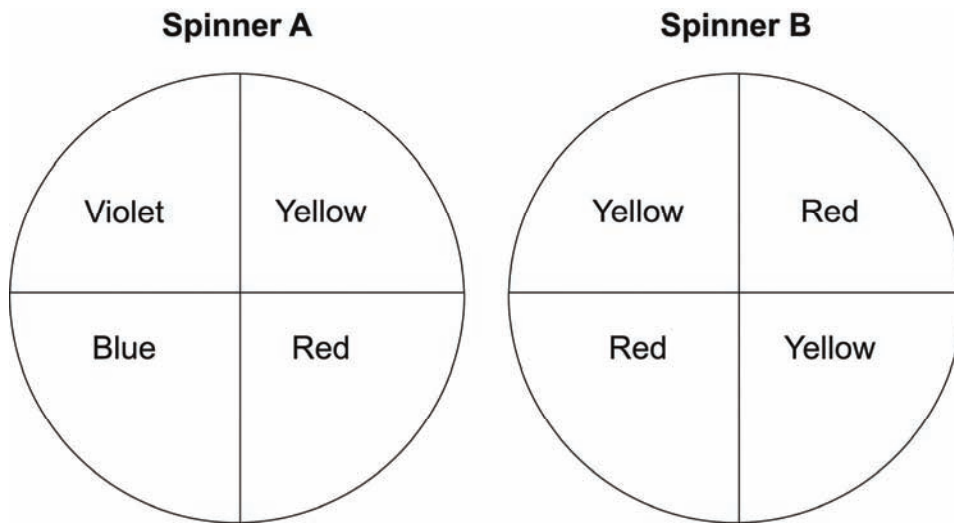
2. Describe an experiment for which an event occurs with each probability.
 - a) 1:3
 - b) $\frac{1}{6}$
 - c) 100%
 - d) 3:8

3. A spinner has 9 equal sections.
Three sections are purple, 1 section is black, 2 sections are yellow, and 3 sections are red.
You spin the pointer.
Write each probability three ways.
 - a) The pointer lands on purple.
 - b) The pointer lands on black or yellow.
 - c) The pointer does not land on red.

4. Five hundred raffle tickets were sold.
One ticket wins the prize.
Write each probability as many ways as you can.
 - a) Kendall purchased 8 tickets.
What is the probability that Kendall will win the prize?
 - b) Lana purchased 10 tickets.
What is the probability that Lana will win the prize?
 - c) Anthony purchased 25 tickets.
What is the probability that Anthony will not win the prize?

Extra Practice 6A**Lesson 7.6: Tree Diagrams**

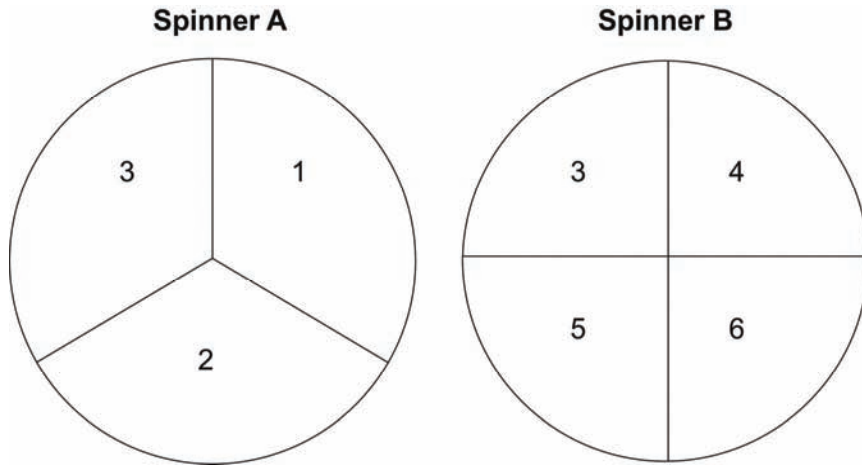
1. A popular game at the winter carnival is a spinner game called *Tropical Orange*. To play the game, a player spins the pointer on each of the spinners. To win, a player must get red on one spinner and yellow on the other spinner, because red and yellow make orange. Use an open paper clip as a pointer on the spinners below.



- a) Play the game at least 40 times. Record your results.
How many times did you make orange?
- b) Use your results. Calculate the experimental probability of making orange.
- c) Use a tree diagram to list the possible outcomes for making orange.
- d) What is the theoretical probability of making orange?
- e) How do the probabilities in parts b and d compare?
2. A regular tetrahedron has four faces labelled 1 to 4. A die is labelled 1 to 6. An experiment is: roll the tetrahedron and record the number on its face down, roll the die and record the number on its face up.
- a) Draw a tree diagram to determine the possible outcomes.
- b) Find the probability of each event:
- i) rolling two even numbers
 - ii) rolling two numbers whose sum is 6
 - iii) rolling a 4
 - iv) rolling two numbers whose difference is 0 or 1

Extra Practice 6B**Lesson 7.6: Tree Diagrams**

1. Here is a spinner game called *Sum Up*. To play the game, a player spins the pointer on each spinner and then finds the sum of the two numbers. Use an open paper clip as a pointer on the spinners below.



- a) List the possible sums.
 - b) Play the game at least 40 times. Record the results.
 - c) Use your results. What is the experimental probability of getting each sum?
 - i) 9 ii) 6 or 8 iii) 5
 - d) Draw a tree diagram to list the possible outcomes.
 - e) What is the theoretical probability of getting each sum in part d?
 - f) Compare the theoretical and experimental probabilities of the events in part d.
What do you think might happen if you carried out this experiment 1000 times?
2. A charity drive invites people to donate gifts for children at holiday time. To select the type of gift to donate, you select from 2 choices:
- a toy
 - a book or recording
 - clothing for a boy
 - clothing for a girl
 - newborn to 12 months
 - 1–3 years
 - 4–6 years
 - 7–10 years
- a) Determine all possible outcomes.
 - b) Suppose you select the type of gift without looking at the choices. What is the probability that you choose:
 - i) buying a toy for a child aged 4 to 6?
 - ii) buying something other than clothing, for a child under the age of 1?

Extra Practice Sample Answers

Extra Practice 1A

Lesson 7.1

- a) 7 b) 22 c) 11 d) 85
- a) 12 b) 34 c) 76 d) 7
- a) 55, 6, 109
b) No mode, no mode, 123
c) Ottawa; He has a high number of shutouts and low number of goals against compared to the number of games played.

Extra Practice 2A

Lesson 7.2

- a) 72, 46
b) 45, 66
c) 101, 455
d) 53, 61
- a) 140 b) \$342.50
- Answers will vary. For example:
a) 11, 17, 21, 48, 51
b) 8, 15, 22, 23, 24, 36, 41, 54, 89, 1138
c) 14, 17, 17, 19, 21, 22, 23, 24
- Order the numbers from least to greatest.
Calculate the mean of the 10th and 11th number in the data set.
- Answers will vary. For example:
What is the range? What is the median number?
If you remove the median number, what is the new median?
What effect does removing the median have on the range?
(22; 37; 35.5; *Removing the median has no effect on the range.*)
- Answers will vary. For example:
18, 20, 21, 22, 24, 25, 25, 26
The median of these numbers is 23, and the mode is 25.

Extra Practice 3A

Lesson 7.3

- a) 277, 253, 253
b) 172 and 422
c) 273, 253, 253
When the outliers are not included, the mean is lower, but the median and mode are unaffected.
- a) 52, 48, 48
b) 20 and 98
50, 48, 48
When the outliers are not included, the mean is lower, but the median and mode are unaffected.
c) No, when hiring new servers the manager should not mention the outliers in the average tips earned. It is not typical for servers to earn either so much or so little, and it will give new employees false ideas of what they should expect to earn.
- a) The conclusion is correct, because the mode represents the number that occurs most often, therefore, in this case it is the boot size that sold most often.
b) The conclusion is incorrect, because the mean is the sum of the data values divided by the number of data values. So there could have been more or less than 312 students who ate their breakfast that day.
- a) 49, 45, 40
b) 120 and 0

About 47.8, 45, 40

When the outliers are not included, the mean is lower, but the median and mode are unaffected.

- c) Yes, to understand how much time the class is spending practising, all times should be included.

Extra Practice 4A

Lesson 7.4

- 863, 861, 860
 - Any of the measures would best describe the data because all 3 are close in value.
 - 40
 - 827

Yes, this is possible. It is lower than any of his previous scores, so the student is quite capable of achieving such a score.
- $[(11 \times 498) + (12 \times 500) + (1 \times 502) + (10 \times 503) + (6 \times 505)] \div 40$
 - 501 g, 500 g, 500 g
 - Yes, this shipment is acceptable, because the mean mass is 501 g which is greater than 500 g.
 - 499.2 g

Extra Practice 5A

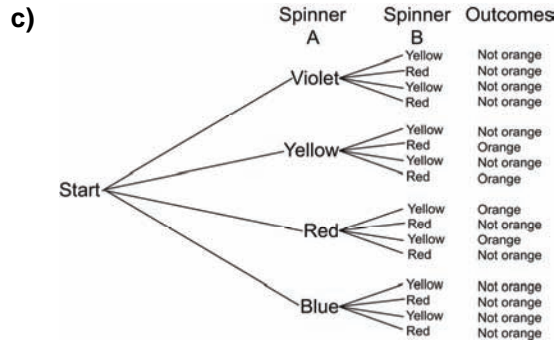
Lesson 7.5

- $\frac{1}{5}$, 1:5, about 20%
 - $\frac{3}{5}$, 3:5, about 60%
 - $\frac{9}{35}$, 9:35, about 26%
 - $\frac{6}{35}$, 6:35, about 17%
- Answers may vary.
 - Roll a multiple of 3 on a number cube labelled 6 to 11.
 - Roll 6 on a number cube labelled 1 to 6.
 - Roll a number greater than 0 on a tetrahedron labelled 1 to 4.
 - With your eyes closed, pick a tie with polka dots from a drawer with 2 polka dot ties, 3 striped ties, 1 polka dot and striped tie and 2 plain ties.
- $\frac{1}{3}$, 1:3, about 33%
 - $\frac{1}{3}$, 1:3; about 33%
 - $\frac{2}{3}$, 2:3; about 67%
- $\frac{2}{125}$, 2:125; about 1.6%
 - $\frac{1}{50}$, 1:50; about 2%
 - $\frac{19}{20}$, 19:20; 95%

Extra Practice 6A

Lesson 7.6

- Answers will vary. I made orange 9 times in 40 trials.
 - The experimental probability of making orange is $\frac{9}{40}$ or about 23%.

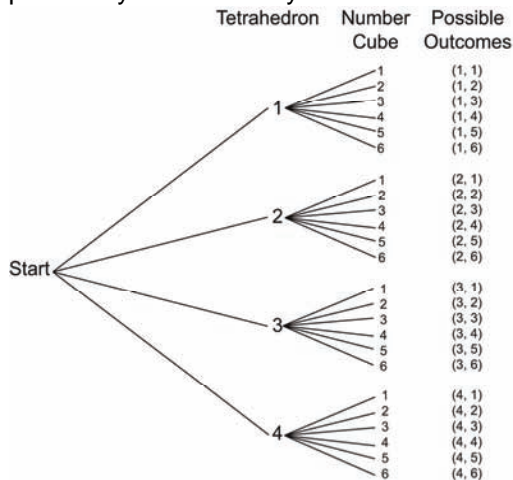


d) There are 16 possible outcomes. There are 4 outcomes that make orange.

The probability of making orange is $\frac{4}{16} = \frac{1}{4}$ or about 25%.

e) Answers may vary. The experimental probability of making orange is about 23% and the theoretical probability is 25%. They are close in value.

2. a)



b) There are 24 possible outcomes.

i) There are 6 outcomes with 2 even numbers: (2, 2), (2, 4), (2, 6), (4, 2), (4, 4), and (4, 6)

The probability of rolling 2 even numbers is $\frac{6}{24} = \frac{1}{4}$ or about 25%.

ii) There are 4 outcomes with numbers whose sum is 6: (1, 5), (2, 4), (3, 3), and (4, 2)

The probability of rolling two numbers whose sum is 6 is $\frac{4}{24} = \frac{1}{6}$ or about 17%.

iii) There are 9 outcomes with a 4: (1, 4), (2, 4), (3, 4), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), and (4, 6).

The probability of rolling a 4 is $\frac{9}{24}$ or about 38%.

iv) There are 11 outcomes with numbers whose difference is 0 or 1: (1, 1), (1, 2), (2, 1), (2, 2), (2, 3), (3, 2), (3, 3), (3, 4), (4, 3), (4, 4), and (4, 5)

The probability of rolling two numbers whose difference is 0 or 1 is $\frac{11}{24}$ or about 46%.

Extra Practice 6B

Lesson 7.6

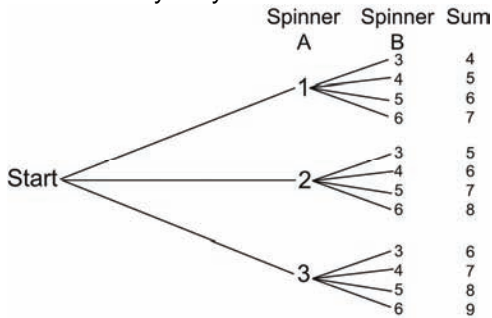
1. a) 4, 5, 6, 7, 8, 9

b) Answers may vary.

Sum	4	5	6	7	8	9
Frequency	3	5	9	14	7	2

c) Answers may vary.

d)



e) There are 12 possible outcomes.

i) There is one outcome with sum 9: $\frac{1}{12}$ or about 8%.

ii) There are 5 outcomes with a sum of 6 or 8: $\frac{5}{12}$ or about 42%.

iii) There are 2 outcomes with sum 5: $\frac{2}{12} = \frac{1}{6}$ or about 17%.

f) Answers may vary. The values of the experimental probabilities are close to those of the theoretical probabilities. The theoretical and experimental probabilities would become closer in value if the experiment is carried out 1000 times.

2. a) toy, newborn to 12 months;

toy, 1–3 years;

toy, 4–6 years;

toy, 7–10 years;

book or recording, newborn to 12 months;

book or recording, 1–3 years;

book or recording, 4–6 years;

book or recording, 7–10 years;

clothes for boy, newborn to 12 months;

clothes for boy, 1–3 years;

clothes for boy, 4–6 years;

clothes for boy, 7–10 years;

clothes for girl, newborn to 12 months;

clothes for girl, 1–3 years;

clothes for girl, 4–6 years;

clothes for girl, 7–10 years

b) i) $\frac{1}{16}$; about 6%

ii) $\frac{1}{8}$; 12.5%