Chapter 12 *MathLinks 7*
Student Resource Answers

12.1 Median and Mode, pages 426–427

4. a) median: 4; mode: 4
b) median: 19; modes: 18 and 21
c) median: 8; mode: 8
5. a) median: 6; mode: 6 **b)** median: 10; no mode **c)** median: 18; mode: 18
6. median: 42; mode: 42
7. median: 3; mode: 3
8. median: $15.50; mode: $14
9. median: $3; mode: $2
10. a) modes: 100 g, 110 g
b) median: 102.5 g
c) median: 102.5 g; modes: 100 g, 110 g
11. a) 170 cm. It is the height with the greatest number of occurrences in the survey.
b) median: 165 cm
12. Answers may vary. For example, 7, 7, 15, 16
13. 1, 2, 3, 4, 4
14. a) $n = 4$
b) n is a whole number, $n \neq 5$ or $n \neq 6$
15. a) $n = 4$ **b)** n is a whole number, $n \geq 4$
16. x and y belong to the whole numbers, $x \geq 5$, $y \geq 5$
17. 8, 8, 12, 13, 15

12.2 Mean, pages 431–433

3. a) 6 **b)** 2 **c)** 60
4. a) 7.5 **b)** 2.3 **c)** 100
5. 8.5 **6.** 1.5 L
7. a) 12 points **b)** 19 points
8. a) 4 cm **b)** 11 cm
c) Answers may vary. 48 cm
9. a) 13.8 h **b)** Answers may vary. Western Canadian teens watch less TV on average than others. **c)** Answers may vary. The mean for the provinces not listed would have to be more than 14.0, since the mean for the four provinces listed is less than 14.0.
d) Answers may vary. 2 h
e) Answers may vary. 140 h
10. 48.3 homes
11. a) 80% **b)** 89%
12. a) 23°C **b)** Answers may vary. 24°C. The temperature should be closer to the temperature of North Battleford and Yorkton, since the mean includes the cooler temperatures of two northern locations.
13. a) 75 **b)** 100 **c)** 75%
14. 28.8% **15.** $9.50
16. a) .341 **b)** Answers may vary. Joe has the better updated batting average.
c) Joe's batting average is .358 and Mike's batting average is .356.

12.3 Range and Outliers, pages 437–439

3. a) 13 **b)** 12 **4. a)** 24 **b)** 16
5. 23 s
6. a) 37 **b)** 115 **c)** 888, 1
7. a) 666 **b)** 0, 211 **c)** no outliers
8. a) 8 **b)** 1 **c)** 2
9. a) 27 min **b)** 54 **c)** Answers may vary. Vincent took longer to complete the puzzle the first time he completed it because he was unfamiliar with the puzzle. **d)** 9 min
10. a) 20°C **b)** −13°C **c)** 33°C
11. 108 **12.** 2.0
13. a) 4.5 **b)** Answers may vary. No. The range is too small.
14. a) range: 15; median: 15; no mode; mean: 14
b) range: 15; median: 25; no mode; mean: 24. The median and mean are 10 higher than in part a).
c) range: 150; median: 150; no mode; mean: 140. The new measures are ten times the answers to part a).
15. a) 1, 4, 4, 6, 10 **b)** 5 min
c) Add the times of the five contestants, and then divide by 5.
16. a)–d) Answers may vary.
e) It is not possible to obtain a sum of 19. The highest sum that two single digits can have is 9 + 9 = 18.

12.4 The Effects of Outliers, pages 444–445

3. a) 82% **b)** median: 40%; mean: approximately 41.9% **c)** Answers may vary. 6%, 88%. No. The lower and higher numbers that are outliers are valid data for the students that had at least one song by the musicians.

4. a) 45 **b)** median: 9; mean: 14.25
c) Answers may vary. 52. Yes. If the sample is to include only students, the age of 52 years old is not representative of a student's age.
5. a) $8.32 **b)** median: $1.59; mean: $3.11
c) Answers may vary. $9.61. Yes. The price of $9.61 may have been an error in recording made by Sharon. She may have meant to record a price of $1.69.
d) Answers may vary. The median and mode will be lower and more consistent with the rest of the data.
median: $1.49; mean: $1.49
6. a) 41 **b)** median: 34; mean: 37.4
c) Answers may vary. 70. Yes. The outlier could be an error in measuring the number of heartbeats in 15 seconds.
d) The median and mode will be lower and more consistent with the rest of the data. median: 33; mean: 33.8
7. a) 80 **b)** median: 80; mean: 73.75
c) Answers may vary. 20%. No. The score of 20% is still a valid score. It may just indicate that he was unprepared for the test.
d) median: no change; mean: 81.4. There is no change in the median for this question. The mean will be higher and more consistent with the rest of the data.
e) Use the mode or remove the outlier and use the mean.
8. Answers may vary. For example, 0, 47, 48, 49, 50, 51, 52, 53, 100

12.5 Choose the Best Measure of Central Tendency, pages 449–451

3. a) median: 5; mode: 7; mean: 4.9
b) Answers may vary. Mean or median. The mode is not a good choice because it represents the highest value in the set of data.
4. mode: 8
5. a) mean: 7.9; modes: 7 and 8
b) mode. The mean does not provide any meaningful information about shoe sizes.
6. a) median: $145 000; mean: $523 000
b) median
7. a) mean: 13.6; median: 10; mode: 10
b) Answers may vary. Median or mode. The outliers represented by the teacher's and assistant's ages have been included when calculating the mean.
8. Answers may vary. Contemporary rock; mode, since 31% represents the most popular choice
9. a) Answers may vary. The mode because it shows the highest success rate
b) Answers may vary. The mean would likely provide a more realistic measure of the success rate of the disinfectant.
10. a) Grade 6 **b)** Grade 1: 5; Grade 2: 4; Grade 3: 4.5; Grade 4: 6; Grade 5: 5; Grade 6: 5; Grade 7: 5
c) Grade 4. Answers may vary. On average, each student collected more cans than any of the students in the other grades.
11. 14. The set of numbers is 1, 2, 6, 7, 14.
12. Answers will vary. 29. The set of numbers could be 26, 28, 29, 29.
13. 18
14. mean: 6
15. a) Mode because you could tell Kyle that the most students had 70% on the test
b) Median because half of the class had scores above 90%
16. Answers may vary. For example, recommended hours of homework, suggested salary/wage increase

Chapter 12 Review, pages 452–453

1. median **2.** mean **3.** outlier
4. range
5. mode: 5; median: 5
6. mode: 21; median: 20
7. Answers may vary. For example, 2, 3, 4, 6, 7, 7 **8.** 2.7 days
9. a) 700 km **b)** 7 days
10. a) 7 **b)** 24 **c)** 11
11. a) highest: 644; lowest: 17 **b)** 627
c) Answers may vary. 644, 17, 25. The number of fires caused by humans may depend on the number of humans living in the area. The territories have lower populations than the other provinces.
12. a) MB: $12.62; AB: $16.16; BC: $12.11
b) $4.85
13. a) median: 21; mean: 43.7 **b)** Answers may vary. 197. Yes. The outlier is a much larger number than the other numbers in the set of data.

c) The median without the outlier will be slightly lower than the median if the outlier is included. The mean without the outlier will be much lower than the mean if the outlier is included. median: 19.5; mean: 18.2

14. a) Class A median: 1; Class B median: 3
b) Class A mean: 3; Class B mean: 2.5
c) Answers may vary. For example, Class B should get the prize because more students brought in cans of food. Class A relied heavily on one student to bring in 37 cans.

Chapter 12 Practice Test, pages 454–455

1. B **2.** D **3.** A **4.** 5 **5.** 5 **6.** 4.6

7. Answers will vary. The mean, median, and mode will increase by 20.

8. Answers will vary. **a)** Favourite colour choice, favourite music type, most common shoe size, etc. **b)** A set of data that includes an outlier that is much higher or lower than the other values. **c)** A set of data without any outliers and that contains values that are spread across the entire range of data.

9. a) range: 16.8% **b)** mean: 34.05%

10. a) 43.2 m **b)** Answers will vary. 25 m. Yes. This may have been the first run when the snow was not packed down.

11. a) median: 12 s; mean: 14.4 s **b)** median
c) Answers may vary. 34. Yes. The outlier does not match the rest of the data.
d) median: 11.5 s; mean: 11.2 s

12. a) 14 h **b)** mean: 4.1 h; median: 2.5 h; modes: 2 h and 2.5 h
c) Answers may vary. Yes. The outlier 15 because there are not 15 h in a night.
d) the mean by 1.82 h

13. a) 7 **b)** 75% **c)** 69% **d)** Answers may vary. Cam may have been out of practice. **e)** The median and mean will be higher. median: 80%; mean: 74.4%
f) Answers will vary. No. Cam's performance is better represented without including the outlier.

Chapters 9–12 Review, pages 458–460

1. a) $(+6) + (-4) = +2$ **b)** $(+4) + (-9) = -5$

2. a) $(+4) - (-2) = +6$ **b)** $(-1) - (-5) = +4$

3. a) 0 **b)** +3 **c)** −2 **d)** +16 **e)** −4 **f)** +7

4. +9°C **5.** 413 m deep

6. a) Add 3 to the preceding number starting at 1. 13, 16 **b)** Add 5 to the preceding number starting at 8. 31, 36
c) Subtract 3 from the preceding number starting at 17. 5, 2

7. a) The denominator of each fraction is 30. Add 3 to the numerator of the preceding fraction starting with the numerator of 2. Add 0.1 to the decimal equivalent of each fraction in the pattern starting with the decimal equivalent of $\frac{2}{30}$, which is $0.0\overline{6}$.
b) $\frac{11}{30}$ **c)** $0.5\overline{6}$

8. a)

Figure Number	Blue Tiles	White Tiles
1	6	3
2	12	6
3	18	9
4	24	12
5	30	15

b) The number of blue tiles is twice the number of white tiles.
c) Let w represent the number of white tiles: $2w$ **d)** 48

9. a) 28 **b)**

Figure Number, n	Perimeter
1	6
2	8
3	10
4	12
5	14
6	16

10. a)

Number of Cars, x	Number of Riders, y
1	4
2	8
3	12
4	16
5	20

b) $4x$ **c)** Answers may vary. The points lie in a straight line. The y-values are 4 times the x-values. **d)** 40 riders

11. a) $2x - 4$, 2 **b)** $2x - 4 = 2$

12. a) $k = 26$ **b)** $p = 0$ **c)** $n = 9$ **d)** $c = 24$

13. a) $3x + 2 = 11$, $x = 3$ **b)** $2x + 3 = 7$, $x = 2$
14. 16 cm
15. a) C represents the cost for one day; n represents the number of students.
b) 25 students
16. a) 25 **b)** 26 **c)** 28
17. $x = 6$; y is a whole number that cannot equal 4. Or, $y = 6$; x is a whole number that cannot equal 4.
18. a) 32 min **b)** 28 min **c)** Answers may vary. For example, the weather was too stormy for a longer walk. **d)** 6 min
19. 243 points **20.** 69.2%
21. a) \$3.99 **b)** median: \$3.49; mean: \$4.11
c) Answers may vary. Median.
d) Answers may vary. \$6.98. Yes. The price is double the others. The orange juice container may be larger than the other containers.
e) median: \$3.39; mean: \$3.39
22. Answers may vary. The mode would advertise the effectiveness of the new chemical to destroy 99% of cockroaches.