Answers

Chapter 1

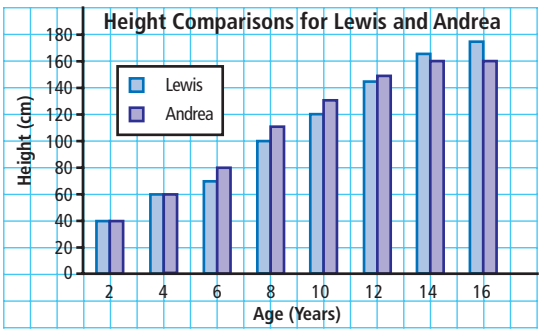
1.1 Advantages and Disadvantages of Different Graphs, pages 13–17

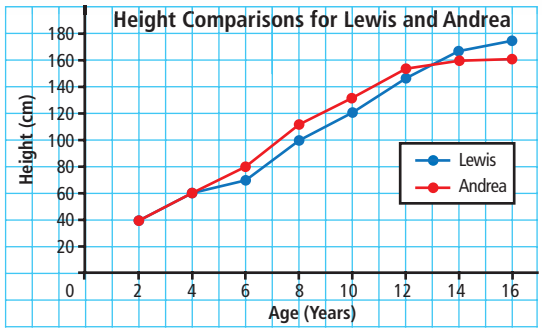
4. a) Ravi spends $10 more on food than on movies. The pictograph better shows how much more he spent on food than movies because each symbol in the pictograph represents $10, and no partial symbols were used. In the circle graph the percents must be multiplied by $200 to determine the amounts spent on food and movies. **b)** The circle graph shows that half of the circle is made up of the categories *Food* and *Clothing*. **c)** One advantage of the circle graph is that the categories are represented as percents of his total spending. One advantage of the pictograph is that it is a precise way of presenting each amount since the amounts are all multiples of ten. One disadvantage of the circle graph is that it is necessary to perform calculations to determine the dollar amounts spent on each category. One disadvantage of the pictograph is that the percent of his money spent on each category must be calculated.

5. Answers may vary. Example: **a)** The circle graph shows the percent of time out of a total of 40 h that each person practises each week. The bar graph shows the number of hours of practice each person does each week. **b)** "Which two people together use 75% of the practice time?" Min and Ann together use 75% of the practice time. **c)** "How much longer does Ann spend practising than Sara each week?" Ann spends 6 h more practising than Sara each week.

6. a) The line graph shows the change of growth from week 1 to week 4. The pictograph shows the height of the plant at the end of weeks 1, 2, 3, and 4. **b)** The plant grew at the same rate between weeks 1 and 2, and weeks 2 and 3. **c)** The plant changed the most in height between weeks 3 and 4. The line graph shows this change more clearly. **d)** One advantage of the line graph is that it shows the rate of change of the growth of the plant. One advantage of the pictograph is that it shows the height of the plant after each week. One disadvantage of the pictograph is that it does not show the rate of change in height.

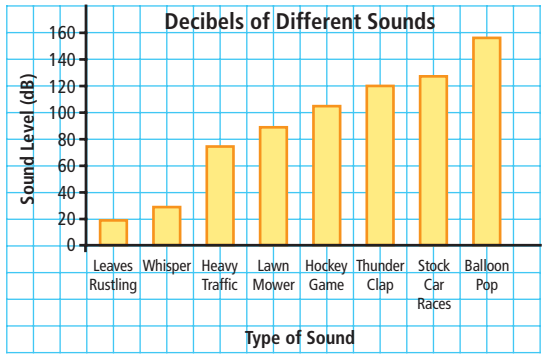
7. a)





b) The trends are similar in that both friends' heights are increasing from age 2 to age 14. The trends are different in that Andrea's height stops increasing after age 14, but Lewis' height continues to increase after age 14. **c)** The line graph shows their height trends more clearly because it shows changes in their heights over time. **d)** Because the heights are not parts of a whole, circle graphs would not be effective.

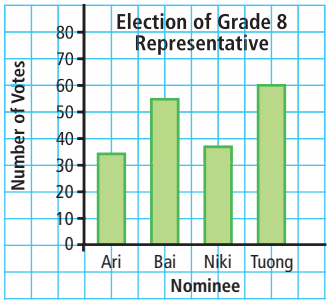
8. a)



A bar graph allows for an accurate comparison of sound levels. **b)** Because the data are not a comparison over a period of time, a line graph would not be a good choice of graph. **c)** Because the data do not represent a comparison of parts to a whole, a circle graph would not be a good choice of graph. **d)** A pictograph could be used, but it would not be as accurate as a bar graph because of the fractions of pictures required to represent these data.

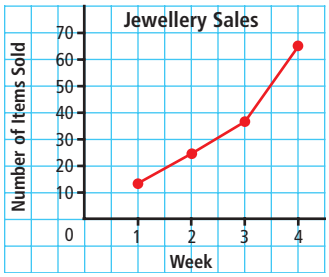
9. a) Science fiction books are 3.4 times as popular as history books. **b)** The circle graph shows the relationship between the different categories of books. **c)** The number of mystery books signed out is about the same as the total number of history and sports books because 10% + 13% = 23%. **d)** Because the circle graph shows the percent of the total for each category, the answer is more apparent. **e)** Science fiction: $4080, Mystery: $2760, Teen romance: $2400, Sports: $1560, History: $1200 **f)** The circle graph is easier to use because the percents are given, and they can be multiplied by $12 000.

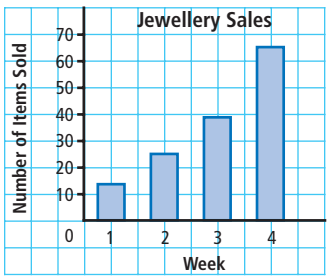
10. a)



b) The bar graph allows you to better estimate the actual number of votes. **c)** A line graph would not be the best choice because the data do not show a change over time. **d)** An advantage of using a circle graph is that you can show the percent of votes that each person received. A disadvantage is that you must calculate the number of votes each candidate received.

11. a) Answers may vary. Example:





b) The line graph shows the change of sales over the four weeks, while the bar graph shows the number of items sold for each of the four weeks. Both graphs are equally effective.

c) The store should continue to sell the jewellery because the line graph shows that the number of sales is steadily increasing over time.

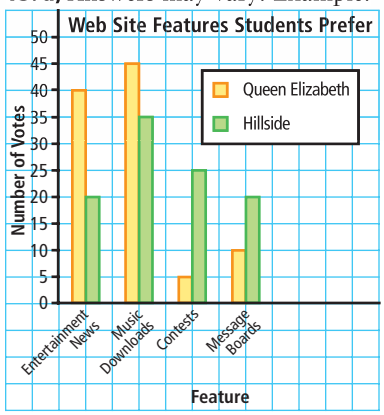
12. a) Answers may vary. Example:

b) A bar or circle graph would be most appropriate.

c) A bar graph would give the number of scores in each range.

Math Test Scores	
Range	**Frequency**
40 to 49	4
50 to 59	4
60 to 69	5
70 to 79	8
80 to 89	5
90 to 99	4
Total	30

13. a) Answers may vary. Example:



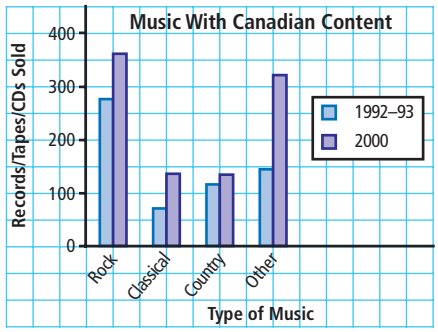
The double bar graph shows a comparison of both schools across the four different categories.

b) *Entertainment News* and *Music Downloads*

14. a) A bar graph or circle graph would be more appropriate for the data. **b)** A line graph is best for showing changes in data over time.

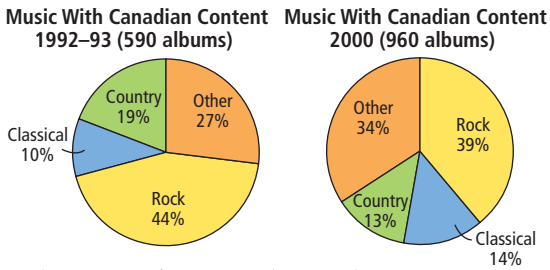
15. Answers may vary according to research. Example:

a)



Possible questions include, "How many more *Rock* albums with Canadian content were sold in 2000 than in 1992–93?" and "How have sales of *Classical* vs. *Country* albums with Canadian content changed from 1992–93 to 2000?" Answer to first question: Approximately 85. Answer to second question: In 1992–1993, more *Country* than *Classical* albums were sold. In 2000, more *Classical* albums were sold than *Country*.

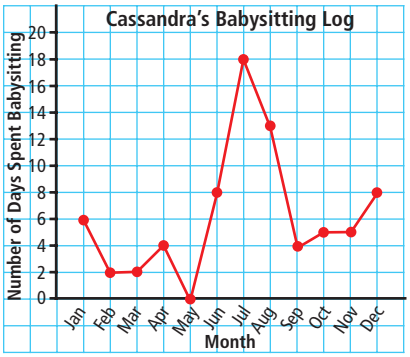
b)



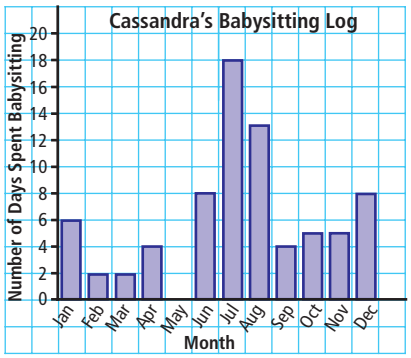
c) "What types of music with Canadian content increased in popularity between 1992–93 and 2000?" and "What type of music with Canadian content was the most popular in 1992–93?" Answer to first question: *Classical* and *Other*. Answer to second question: *Rock*.

d) An advantage to the double bar graph is that you can compare each type of music in each of the years. A disadvantage of the double bar graph is that you do not see what percent of the albums sold each year were a specific type. An advantage of the circle graph is that you can see what percent of the albums sold were each type of music. A disadvantage of the circle graph is that you must have two separate graphs to illustrate the data.

16. Answers may vary. Example: **a)** The graph could represent the number of days that Cassandra babysat for her neighbour in each month from January to December.



b)



c) It is difficult to quickly add all of her hours for the year. A pictograph may be easier for this task.

17. a) Answers may vary. Example: A survey question to ask members of your class could be, "What is your favourite season of the year: winter, spring, summer, or fall?" There are four choices, and there is a good chance that there will be a different number of people responding with each option. **b)** Since the total number of people responding to the question will be known, the percent for each response can be calculated. **c)** Answers may vary. Example: A survey question to ask members of your class could be, "How many hours a week do you spend watching television?" A bar graph or pictograph may be more suitable.

1.2 Misrepresenting Data, pages 23–27

4. a) The scale of the *y*-axis is misleading because it contains a break. **b)** The graph suggests that the temperature increased by a significant amount between 8 a.m. and 2 p.m. **c)** The graph should be redrawn with a consistent scale on the vertical axis from 0 °C to 32 °C, with no break.

5. a) 3 **b)** 2 **c)** Answers may vary. Example: It appears that candidate B received 3 times as many votes as candidate A. **d)** The graph could be redrawn with the vertical axis showing values from 0 to 200, with no break.

6. a) Apples seem to sell the best because the line containing the apple symbols is longer than the lines for the other fruit. **b)** Answers may vary. Example: It appears that about the same number of each fruit was sold because the line representing each type of fruit is approximately the same length. **c)** The pictograph should be redrawn so that each symbol is the same size, and the symbols should be spaced the same distance apart.

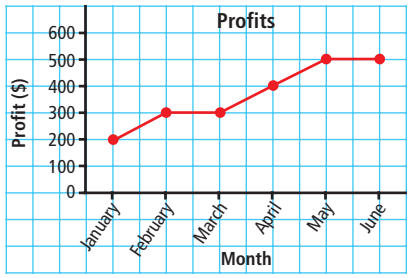
7. a) The Big Cheese appears to be the favourite burger because it is larger than the Bonzo Burger. **b)** Answers may vary. Example: The sizes of the burgers suggest a significant difference in the taste test results. **c)** Use a pictograph, with each symbol the same size, and space each symbol equally on the line.

8. Answers may vary. Example: **a)** The horizontal scale has a break from levels 0 to 10. Also, the width of each bar is not equal. **b)** Scott's progress appears to be more than twice as much as Bryce's progress. **c)** Start the scale at zero with no break between levels 0 and 10, and make Scott's and Bryce's bars have equal widths.

9. Answers may vary. Example: **a)** The vertical axis in Graph A has a uniform scale from 0 to 160 by units of 20. The vertical axis in Graph B has a break between 0 and 140, after which the scale increases uniformly by units of 2. **b)** In Graph A it appears that the sales were very near the same amount for each student. In Graph B it appears that Chris sold twice as many bars as Megan. **c)** Graph A is more accurate because the vertical scale has no break.

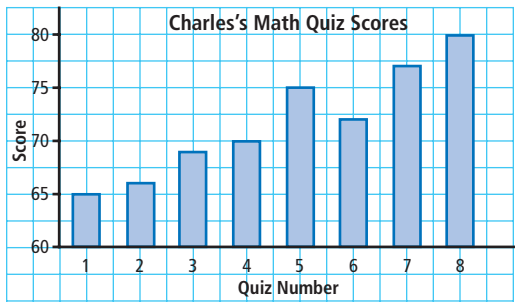
10. Answers may vary. Example: **a)** The vertical scale has a break between 0 and 200. **b)** The profits seem to be four times as high in June as they were in January.

c)

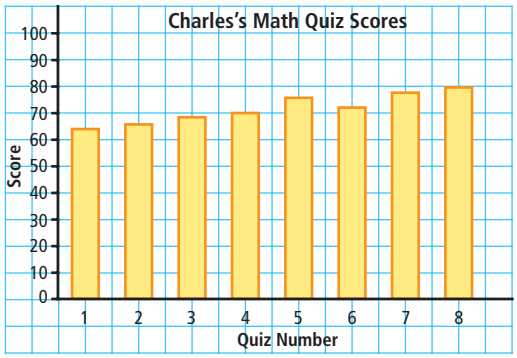


Profits are two and a half times as high in June as they were in January.

11. Answers may vary. Example: **a)**



b)



c) In Graph A it appears that Charles' scores have been increasing by a large amount. In Graph B the increase in scores does not seem as large.

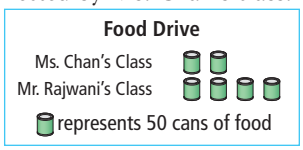
12. a) The vertical scale goes from 0 to 500, but the greatest number of votes was less than 200. Therefore, it appears that all three candidates were close to winning, and the title implies that all three candidates tied.

b) Answers may vary. Example: Candidate B barely won the election. **c)** No, the votes were not divided evenly three ways. Answer may vary. Example: A new title could be *Election Results*.

13. a) Answers may vary. Example: The information does not appear to be the same because the sector sizes in the graphs are different. **b)** The sizes of the sectors in Graph A do not appear to coincide with their percents.

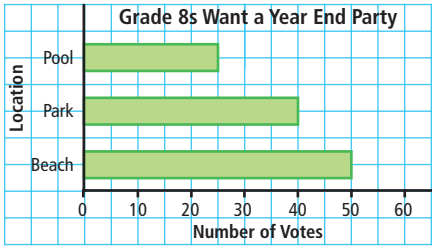
14. Answers may vary. Example: **a)** There is no scale or legend for comparison purposes. Also, the number of cans in each box is equal **b)** Mr. Rajwani's class appears to have collected 4 times the amount of food that was collected by Ms. Chan's class.

c)



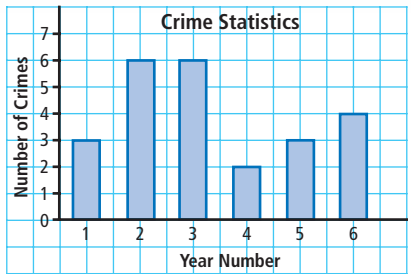
15. a) The beach appears to be about three and a half times as popular as the pool. **b)** No, the majority did not choose the beach. Only 50 out of the 115 votes cast were for the beach.

c) Answers may vary. Example:

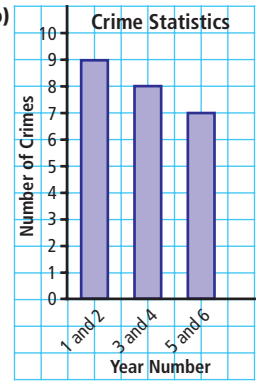


16. a) *Cool Flavours* probably created this graph because it appears that they sell twice as much ice cream as *Dairy Tasty*. **b)** Answers may vary. Example: There is no scale for comparison purposes.

17. a)

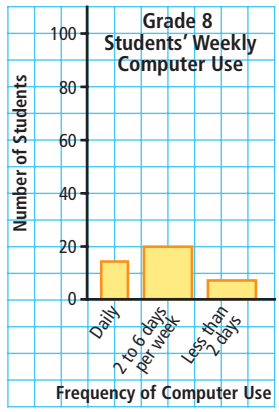


b)



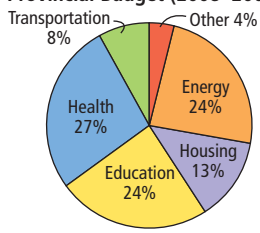
c) Answers may vary. Example: It appears from the second bar graph that the number of crimes is consistently decreasing. This does not support the data in the table. The number of crimes went down for year 4, but the number of crimes increased in the last two years. **d)** The second graph is misleading because the data for each year are not represented separately.

18. Answers may vary. Example:



19. a) Health **b)** Answers may vary. Example: The Health sector is at the front of the diagram and appears much larger than the Energy and Education sectors.

c) Answers may vary. Example:

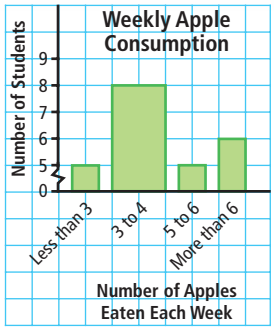


20. Answers may vary. Example: A possible question is, "How many apples do you eat each week?"

a)

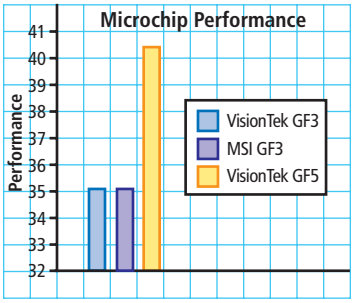
Number of Apples	Tally
Less than 3	𝍸
3 to 4	𝍸 III
5 to 6	𝍸
More than 6	𝍸 I

b) See bar graph.
c) The wider bar in the "3 to 4" category and the break in the vertical axis make it appear that there are 8 times as many students eating 3 to 4 apples each week than there are eating less than 3 each week. There are actually less than twice as many students eating 3 to 4 apples each week than there are eating less than 3 each week.

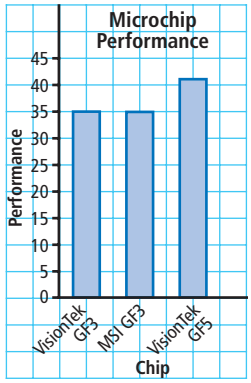


21. Answers may vary. Example: **a)** The scale on the horizontal axis of the line graph does not increase by units of 1 year. The 3-D circle graph distorts the size of the sections. Sales have increased by a large amount from 2004 to 2007, but the annual change is not shown. There are no percent labels on the circle graph. The data on the circle graph may not represent a typical day's sales.
b) Scale the horizontal axis on the line graph by units of 1 year. Change the 3-D circle graph to a 2-D circle graph. Include percent labels in the circle graph.

22. Answers may vary. Example:



a) See bar graph on right.
b) In the original graph, it looked like the VisionTek GF5 chip performed twice as well as the other two chips, but the performance among the chips is relatively similar, as shown in the second graph.



1.3 Critiquing Data Presentation, pages 32–35

4. a) Madison used a double bar graph to compare each type of communication by gender. **b)** The graph is not misleading because it is scaled uniformly with no breaks, and the bars are a consistent width. **c)** Answers may vary. Example: More girls use the Internet than boys. Boys and girls both prefer to communicate in person or on the Internet. **d)** The data do not show a change over time.

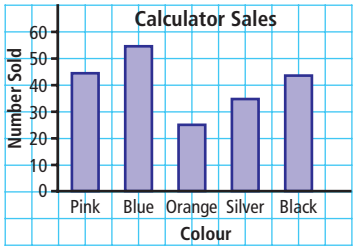
5. Answers may vary. Example: **a)** More grade 9 students spend less than 1 h on the Internet than grade 8 students. Twenty-four grade 8 students spend 2 h to less than 3 h on the Internet. **b)** No, the graph is not misleading. The scale is uniform, there are no breaks, and both axes are clearly labelled. **c)** No improvements are recommended. **d)** A comparison of time spent on the Internet of both grades can be shown on one graph. **e)** Two circle graphs (one for grade 8 students, one for grade 9 students) would show the percent of the students in each grade that use the Internet for each time interval. The circle graphs may be more informative.

6. a) Answers may vary. Example: Eighteen cars in the parking lot were sedans. Forty-eight percent of the cars in the parking lot were either SUVs or minivans. **b)** The graph is not misleading. The sections of the circle are labelled with the category name and percent. The title contains the total number of cars in the lot. **c)** Answers may vary. Example: A circle graph shows a comparison of each car type as a percent of the total number of cars. **d)** Answers may vary. Example: A bar graph could have been used to show a comparison of the number of cars of each type in the lot, but it would not have shown what percent of the cars in the lot was each type of car.

7. Answers may vary. Example: The bar graph shows that *Health* had almost twice as many votes as any other type of organization.

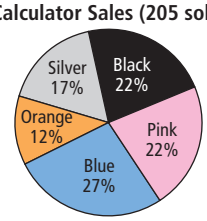
8. a) The size of the blue bar appears to be about three times as large as the orange one, but Truong is not correct. The scale indicates that 56 blue calculators were sold and that 25 orange calculators were sold.

b)



Answers may vary. Example: About twice as many blue calculators as orange calculators were sold.

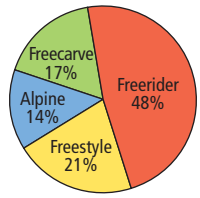
c) Calculator Sales (205 sold)



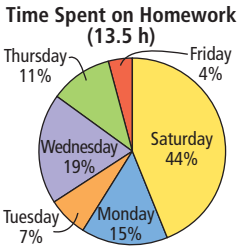
d) Answers may vary. Example: A circle graph shows the percent of the calculators sold for each colour.

9. Answers may vary. Example:
a) See circle graph on the right
b) Almost half of the rentals were of *Freerider*. **c)** The circle graph allows you to clearly see what percent of each type of board was rented. **d)** The type of graph should be a good choice for displaying the data, the graph should be designed in a way that represents the data accurately, and the graph should be informative.

Snowboard Rentals

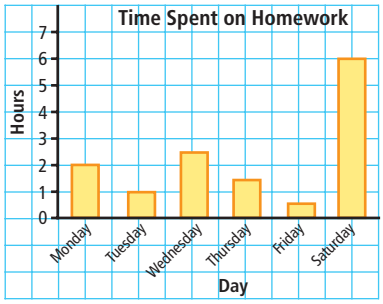


10. a) Although the graph shows that in each two-day period there is an increase in time spent, Chloe has not been increasing the time she spends doing homework over the last 6 days because she only spent 0.5 h doing homework on Friday, but 6 h on Saturday.
b) Yes, the graph is misleading.



c) Answers may vary. Example: Almost half of her homework time was spent on Saturday. Chloe spent the least amount of time doing homework on Friday.

d)

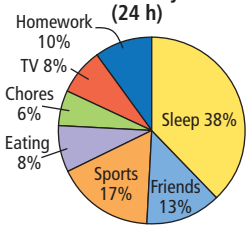


e) Answers may vary. Example: Chloe spent three times as long doing homework on Saturday as she did on Monday. She spent six times as long doing homework on Saturday as she did on Tuesday.
f) Answers may vary. Example: The bar graph is better if a comparison of number of hours is required. A circle graph is better if a comparison of percents is required.
11. Answers may vary. Example: **a)** Graph A makes it appear that there was a small change in minimum wage from 2001 to 2007. Graph B makes it appear that there was a large change in minimum wage from 2001 to 2007.
b) Graph A would support such a claim. Minimum wages have only increased from just over $6 to $8 in 7 years.
c) An employer would use Graph B because it appears that there has been a large increase in the minimum wage over the 7-year period.
12. Answers may vary. Example: **a)** *Connor's Cars* probably developed the bar graph because the drop in sales is not as obvious as it is in the line graph. **b)** *Amy's Autos'* sales have steadily increased. *Connor's Cars'* sales dropped significantly from March to April.

Chapter Review, pages 36–37

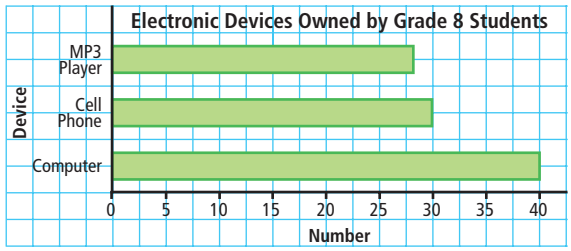
1. E **2.** A **3.** F **4.** C **5.** B
6. a) Answers may vary. Example: The circle graph allows you to determine the exact number of each type of book because it states the total number of books and the percent of each type. The bar graph also shows the number of books of each type, but the exact number is more difficult to read. **b)** The circle graph makes the distribution of the funds easier. Fiction: $500, Sports: $190, History: $60, Science Fiction: $250.

7. Answers may vary. Example:
a) The data could be displayed in a bar graph, a circle graph, or a pictograph.
b)

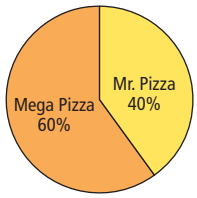


c) An advantage of a circle graph is that it shows what percent of Michelle's time is spent on each activity. A disadvantage of a pictograph is that it is difficult to show exact amounts.

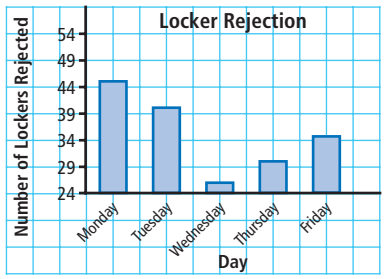
8. Answers may vary. Example: **a)** A bar graph could display the population of the western provinces and territories. **b)** A double bar graph could display the number of boys and girls in each of the grades 7, 8, and 9 at a school. **c)** A circle graph could be used to display how Ross spends his weekly allowance of $20. **d)** A line graph could show the monthly change in Internet usage over a period of one year.
9. a) False. The break in the horizontal axis makes it appear that the number of computers compared to the number of cell phones and MP3 players is much greater than it actually is.
b)



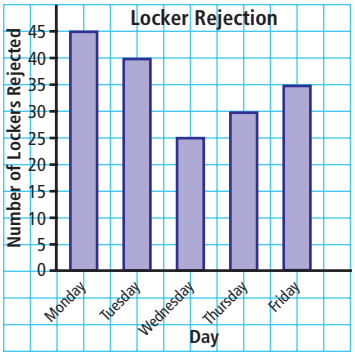
c) Answers may vary. Example: The number of cell phones is 75% of the number of computers.
10. Answer may vary. Example: **a)** It appears that *Mega Pizza* is twice as popular as *Mr. Pizza*.
b)



11. Answers may vary. Example:
a)



b)



c) The first graph makes it appear as if the number of rejected lockers on Monday is more than 20 times the number rejected on Wednesday, while the second graph shows that Monday's rejections were less than twice as many as Wednesday's.

12. a) Answers may vary. Example: The majority of the students are right-handed. There are approximately as many left-handed students as ambidextrous students. **b)** Yes, a circle graph is appropriate because it shows the percent of students in each category. **c)** Answers may vary. Example: A bar graph could be used. An advantage of a bar graph is that the number of students in each category would be displayed.

13. a) Graph A shows a comparison of all seasons' ratings. Graph B shows a comparison of season 4 ratings only. **b)** Answer may vary. Example: A title for Graph A could be *Open Mike Comics Gains Popularity* and a title for Graph B could be *Laughing Out Loud Is the Best Comedy*. **c)** Graph A was created by the producer of *Open Mike Comics* because it shows a steady increase in popularity of *Open Mike Comics*. **d)** Graph B appears to show that *Laughing Out Loud* is more than twice as popular as *Open Mike Comics*, so this graph was probably created by the producers of *Laughing Out Loud*.