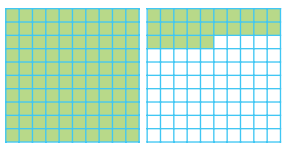
Chapter 4

4.1 Representing Percents, pages 128–129

4. a) 112% **b)** $\frac{2}{10}$% **c)** $85\frac{1}{3}$%

5. a) $\frac{3}{8}$% **b)** $125\frac{1}{2}$% **c)** 282%

6. a)



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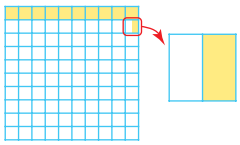

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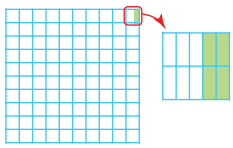

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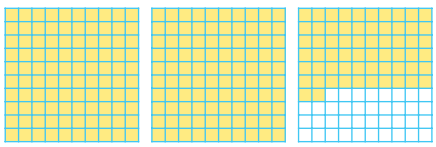

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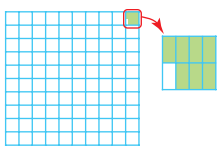

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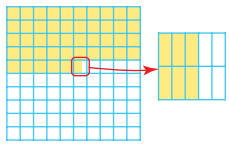
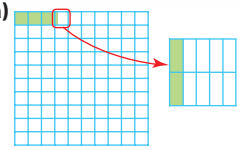


7. a)



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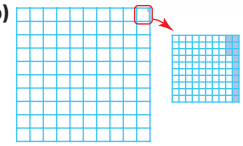

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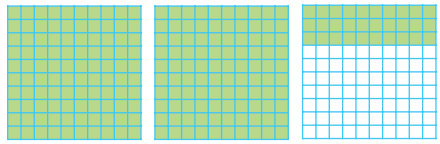
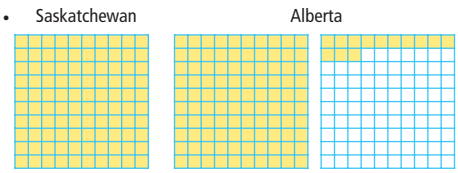


8. a) 3 **b)** 5 **c)** 12

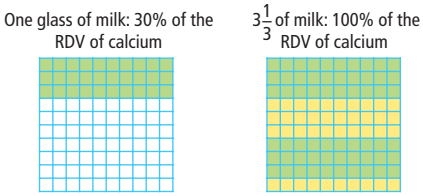
9. Answers may vary. Example: Two situations where the percent will be greater than 100% are a mother's mass compared to her newborn child, and the volume of water in the Pacific Ocean in relation to a lake in Canada.

10. A scientist may need to relate the measurement of something that is less than 1% of its size. Example: The percent of different pollutants in the water will likely be between 0% ands 1%.

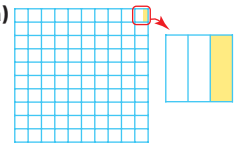
11.



12. Answers may vary.

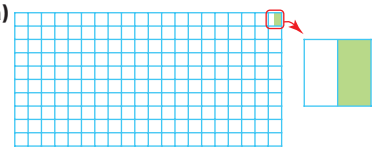


13. a)



b) Answers may vary. You must know how to convert a repeating decimal to fraction form.

14. a)



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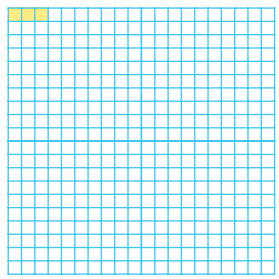
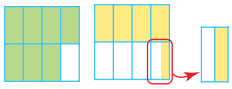


15. Since one square on a hundred grid is equal to 1%, then one square on a thousand grid (10 hundred grids placed together) would be equal to 0.1%. If this pattern is continued, then very small percents can be expressed on larger grids. If a ten million grid was used, then 0.0000125% would be represented by 1.25 squares.

Grid Type (number of squares)	Value of One Square as a Percent
Hundred	1%
Thousand	0.1%
Ten thousand	0.01%
Hundred thousand	0.001%
Million	0.0001%
Ten million	0.000 01%

16. a) 1.7% **b)** 130%

c) $87\frac{1}{2}\%$; $56\frac{1}{4}\%$



4.2 Fractions, Decimals, and Percents, pages 135–137

4. a) 0.004 or 0.4% **b)** 0.405 or 40.5% **c)** 1.4 or 140%

5. a) 1.7 or 170% **b)** 0.105 or 10.5% **c)** 0.006 or 0.6%

6. a) 0.72% or $\frac{72}{10\,000} = \frac{9}{1250}$ **b)** 54.8% or $\frac{548}{1000} = \frac{137}{250}$

c) 345% or $\frac{345}{100} = \frac{69}{20}$

7. a) 25.6% or $\frac{256}{1000} = \frac{32}{125}$ **b)** 0.05% or $\frac{5}{10\,000} = \frac{1}{2000}$

c) 650% or $\frac{650}{100} = \frac{13}{2}$

8. a) 2.48 or $\frac{248}{100} = \frac{62}{25}$ **b)** 0.0056 or $\frac{56}{10\,000} = \frac{7}{1250}$

c) 0.7575 or $\frac{7575}{10\,000} = \frac{303}{400}$

9. a) 0.059 or $\frac{59}{1000}$ **b)** 5.5 or $\frac{550}{100} = \frac{11}{2}$

c) 0.008 or $\frac{8}{1000} = \frac{1}{125}$

10.

Percent	Fraction	Decimal
165%	$\frac{165}{100}$	1.65
230%	$\frac{230}{100}$	2.3
0.38%	$\frac{38}{10\,000}$	0.0038
19.9%	$\frac{199}{1000}$	0.199

11. a) $\frac{17}{25}$ or 0.68 or 68% **b)** $\frac{9}{24} = \frac{3}{8}$ or 0.375 or 37.5%

12. a) $\frac{33}{25}$ or 1.32 or 132% **b)** $\frac{47}{20}$ or 2.35 or 235%

13. 2000%

14. 2.25% or 0.0225 or $\frac{225}{10\,000} = \frac{9}{400}$

15. smallest to largest: 0.6%, $\frac{5}{8}$%, 33.5%, 0.65, 1.32, 145%

16. approximately 0.4% or $0.00\overline{4}$ or $\frac{4}{900} = \frac{1}{225}$

17. Answers may vary. Example: **a)** "Ticket sales are $\frac{13}{10}$ of what they were this time last year." The number 1.3 sounds like a small number. **b)** "We are already at 0.605 of our target and we just started!" The decimal 0.605 is easily recognizable as more than half. **c)** "We have managed to cut our costs by $\frac{75}{10\,000}$." The large denominator makes this number sound large.

18.

Species	Number	Percent of Total	Fraction of Total	Decimal Equivalent
Chinook	143	53.56%	$\frac{143}{267}$	0.5356
Coho	122	45.69%	$\frac{122}{267}$	0.4569
Steelhead	2	0.75%	$\frac{2}{267}$	0.0075

19. 600% or 6.0 or $\frac{600}{100} = \frac{6}{1}$

20. 90 beats per minute: 120% or $\frac{6}{5}$ or 1.2;

125 beats per minute: $166.\overline{6}$% or $\frac{5}{3}$ or $1.\overline{6}$;

150 beats per minute: 200% or $\frac{200}{100} = \frac{2}{1}$ or 2.0

21.

Percent	Decimal	Fraction
a) 1000	10.00	$\frac{10}{1}$
b) 500	5.00	$\frac{5}{1}$
c) 250	2.50	$\frac{5}{2}$
d) 125	1.25	$\frac{5}{4}$
e) 62.5	0.625	$\frac{5}{8}$

4.3 Percent of a Number, pages 142–143

3. a) 6000 **b)** 0.75 **c)** 0.04

4. a) 12 **b)** 1000 **c)** 10.5

5. a) 1.3 **b)** approximately 144.88 **c)** $219.63

6. a) 3.25 **b)** 150.8 **c)** $191.25

7. a) 0.5% **b)** 5

8. $21.42

9. 5957.73 m

10. a) 75 mL **b)** 825 mL

11. approximately 649 004 km^2

12. 1100 km

13. a) Commission is the portion of the sale price that the real estate agent earns. **b)** $18 700

14. 50; 4% is half of 8%, and 50 is half of 100

15. Answer may vary. Example: $572.15, with an assumption that no rounding occurred after each bid.

16. 8

4.4 Combining Percents, pages 148–149

4. $38.04

5. $66.57

6. $38.25

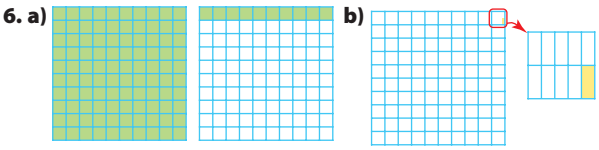
7. a) 132 caribou **b)** The increase is not 30% because the 20% increase in the second year is based on the new population after the 10% increase in the first year.
8. Answers may vary based on the PST rate in your province. Example: Based on a total tax of 12% (GST = 5% and PST = 7%):

Item Purchased	Price	Total Tax (12%)	Total Cost
a) Boots	$119.99	$14.40	$134.39
b) Pants	$89.99	$10.80	$100.79
c) Gloves	$39.99	$4.80	$44.79
d) Helmet	$189.99	$22.80	$212.79

9. a) $23 736 **b)** $26 109.60
10. $362.10
11. a) $1060.90 **b)** 6.09%
12. a) swim: approximately 2.9%; bike: approximately 77.7%; run: approximately 19.4%
b) approximately 97.1%
13. 70%
14. 8%

Chapter Review, pages 150–151

1. percent **2.** fractional **3.** combined
4. a) 2 **b)** 6 **c)** 15
5. a) $\frac{7}{10}\%$ **b)** $\frac{3}{5}\%$ **c)** $50\frac{1}{4}\%$ **d)** 245%
6. a) **b)**



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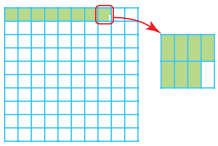

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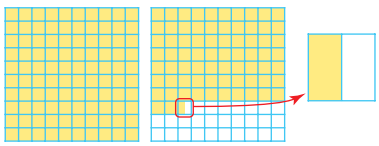

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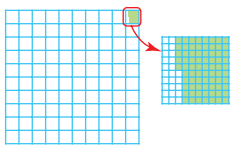

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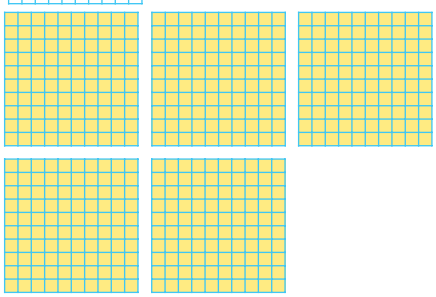
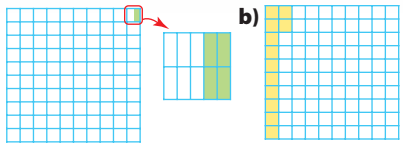


7. a) **b)**



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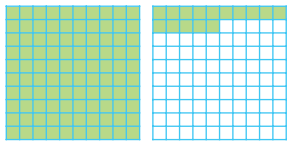
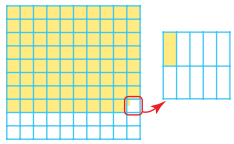


8. a)



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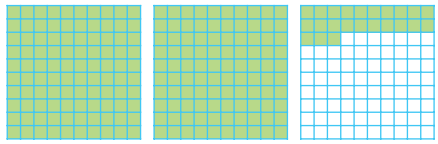

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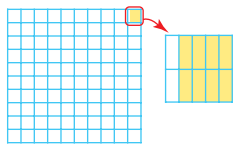


9.

Fraction	Decimal	Percent
a) $\frac{23}{200}$	0.115	11.5%
b) $\frac{19}{80}$	0.2375	$23\frac{3}{4}\%$
c) $\frac{3}{200}$	0.015	1.5%
d) $3\frac{17}{20}$	3.85	385%

10. a) $\frac{110}{100} = \frac{11}{10}$ or 1.1 **b)** Answer may vary. Example: It means that you must give more of an effort than you would normally.
11. a) 0.955 or $\frac{955}{1000} = \frac{191}{200}$; Kyle scored $\frac{191}{200}$ on his practice test. **b)** 1.4 or $\frac{140}{100} = \frac{7}{5}$; The store's sales increased by a factor of 1.4. **c)** 0.009 or $\frac{9}{1000}$; By getting your car tuned up, you can reduce emissions by 0.009 times the original amount.
12. a) 264.5 **b)** 40.4 **c)** 0.1 **d)** 0.8 **e)** 7656 **f)** 500
13. 6.25 cm
14. $5.50
15. a) 1814 trees **b)** fir: approximately 31%; pine: approximately 18%; larch: approximately 9%; cedar: approximately 5%; hemlock: approximately 37%
16. $329.31
17. a) No, the populations did not increase by the same amount. In the second year, the 7% increase in Cedarville is applied to the new population after the initial year increase of 7%. In Pinedale, the 15% increase is applied to the initial population of 1200.
b) Cedarville: 1387 people; Pinedale: 1380 people

Chapters 1–4 Review, pages 156–158

1. Answers may vary. Example: **a)** bar graph: compares data across categories **b)** double bar graph: compares two sets of data across categories **c)** circle graph: compares categories to the whole using percents **d)** line graph: shows changes in data over time

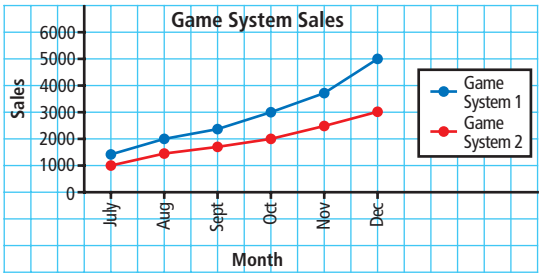
2. a) Answers may vary. Example: A pictograph uses symbols to compare the number of people who prefer different types of food. It would show more clearly that people prefer Italian and Chinese food.

b)

c) The data do not show changes over time.

3. a) Answers may vary. Example: Game system 1 is more popular than game system 2; more game system 1s and game system 2s were sold in December than in the other months; sales of game system 1 and game system 2 both increase each month.

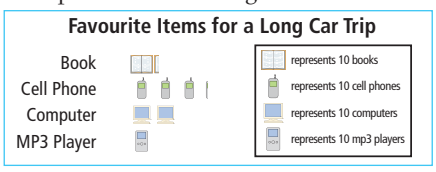
b)



c) Answers may vary. Example: Sales of game system 1 are increasing faster than sales of game system 2; Sales of game systems 1 and 2 both increased from July to December. **d)** Answers may vary. Example: the bar graph; It is easier to see the increases in the bar graph. **e)** Answers may vary. Example: A bar graph's strength is that it is easy to compare two sets of data; a bar graph's limitation is that it is harder to see that one set of data is increasing faster than the other. A line graph's strength is that it is easy to see changes over time; a line graph's limitation is that it is harder to compare sales in a particular month.

4. a) Answers may vary. Example: This graph is misleading because computers appear to be the favourite; the line for computers is the longest one and the symbol for computers is much larger.

b)



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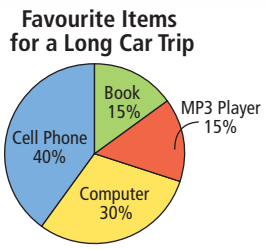
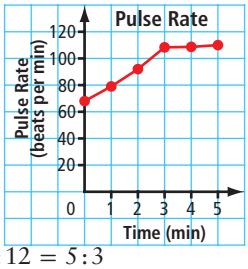


d) Answers may vary. Example: One advantage of using a circle graph is that each section can be easily compared so you know which items are the most and least popular.

5. Answers may vary. Example:
a) See graph on right.
b) His pulse rate increases for the first 3 min and then levels off.
c) A line graph shows change over time, so you can see how Calvin's pulse rate changes over 5 min.



6. a) 12 **b)** $\frac{20}{32} = \frac{5}{8}$; 62.5% **c)** $20:12 = 5:3$

7. Answers may vary. Example: They should charge less than $10.39 for their 4-kg bag of cat food. Calculate the price for 1 kg and multiply it by four.

8. a) Answers may vary. Example: Pasta Supreme appears to be the better buy because it is a much larger quantity for just a little bit more cost. **b)** Super Choice: $0.14/100 g; Pasta Supreme: $0.10/100 g **c)** Pasta Supreme is a better buy because it costs less per 100 g. **d)** Answers may vary. Example: Estimating unit costs is useful because it can help you determine the cheapest brand and help you save money.

9. a) Vehicle 1: 10.63 L/100 km; Vehicle 2: 9.72 L/100 km; Vehicle 3: 10.63 L/100 km
b) Vehicle 2 has the lowest fuel consumption because it uses the least amount of fuel for 100 km.

10. a) $2.56 **b)** 4.4 cm

11. 25

12. a) 64 **b)** 169 **c)** 289 **d)** 6400

13. a) 11 **b)** 30 **c)** 7 **d)** 16

14. a) 36; 49 **b)** 121; 144 **c)** 196; 225

15. a) 7.6 **b)** 11.8 **c)** 2.4 **d)** 5.4

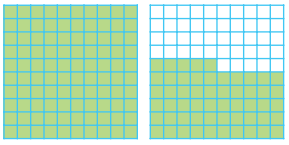
16. 9.5

17. Yes; $11^2 + 60^2 = 61^2$; $121 + 3600 = 3721$

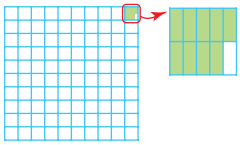
18. a) 118.6 m **b)** $1779

19. 25 m

20.



21. 0.9%



22. a) $0.66\overline{6}$; $\frac{2}{3}$ **b)** 300

23. $28.35

24. 18 000
25. $13.54
26. a) 800 **b)** 196