Discuss the Ideas

1. When might you want to convert:
   - a measurement in SI units to imperial units?
   - a measurement in imperial units to SI units?
2. What relationships can help you check that an answer is reasonable when you convert between systems of measurement?
3. When you use unit analysis to verify an answer, how do you decide which conversion factor to use?

Exercises

A

4. Convert each measurement. Answer to the nearest tenth.
   a) 16 in. to centimetres
   b) 4 ft. to metres
   c) 5 yd. to metres
   d) 1650 yd. to kilometres
   e) 6 mi. to kilometres
   f) 2 in. to millimetres

5. Convert each measurement.
   a) 25 mm to the nearest inch
   b) 2.5 m to the nearest foot
   c) 10 m to the nearest yard
   d) 150 km to the nearest mile

6. Convert each measurement. Answer to the nearest tenth.
   a) 1 ft. 10 in. to centimetres
   b) 2 yd. 2 ft. 5 in. to centimetres
   c) 10 yd. 1 ft. 7 in. to metres

B

7. a) Convert each measurement.
   i) 75 cm to feet and the nearest inch
   ii) 274 cm to yards, feet, and the nearest inch
   iii) 10 000 m to the nearest mile
   b) Use mental math and estimation to justify that each answer in part a is reasonable.

8. The dimensions of a lacrosse field are 110 yd. by 60 yd. What are these dimensions to the nearest tenth of a metre?

9. The Fraser River is approximately 1375 km long. The Tennessee River is approximately 886 mi. long. Which river is longer? Justify your answer.

10. On a road trip in Montana, USA, Elise sees this road sign:

Elise tests the accuracy of her car's odometer and tracks the distance she drove from that sign to Helena's city limits. Her odometer showed 142 km. Is the odometer accurate? Explain.

11. A retail fabric store advertises a storewide sale. It lists a certain material for $0.89/yd. A fabric warehouse is selling the same material for $0.93/m.
   a) Which store has the better price?
   b) Use mental math and estimation to justify that the answer is reasonable.

12. In preparation for les Jeux de la francophonie canadienne, Jean-Luc ran two laps around a 400-yd. track. Michael did seven 110-m hurdle practice races.
   a) Who ran farther?
   b) Use unit analysis to verify the conversion.

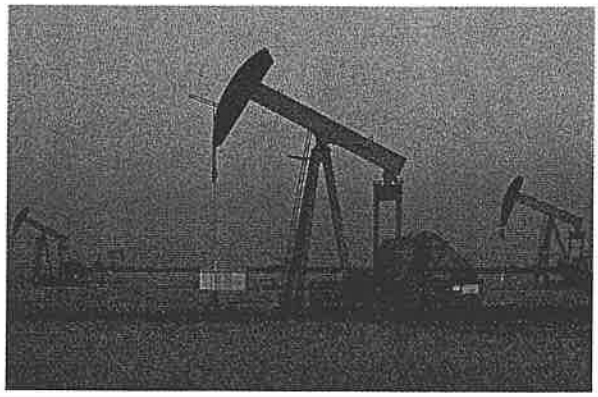
13. The tallest structure in Canada is the CN Tower in Toronto. It is 553.3 m tall. The tallest structure in the United States is the Willis Tower, previously known as the Sears Tower, in Chicago. It is 1451 ft. tall.

a) Determine the height of the CN Tower in feet and the height of the Willis Tower in metres.

b) Which structure is taller? Explain how you know.

c) Determine the difference in the heights of the structures, in metres and to the nearest foot.

14. On a lease site, an oil company determined that there was an oil reserve 1400 m beneath the surface. While the crew drilled, it lined the hole with casing. Each 32-ft. piece of casing was welded to the previous piece to prevent the hole from collapsing. How many sections of casing did the crew need to reach the oil reserve?

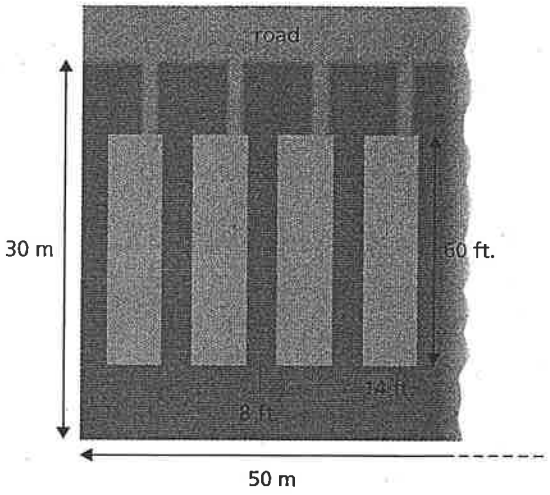


C

15. The rim of a basketball net is mounted 10 ft. off the ground. A basketball player has a maximum reach of 2.5 m. How high, in inches, does the player need to jump to reach 6 in. above the rim?

16. An electrician was hired to run the wires for a surround-sound stereo speaker system. She purchased 2 rolls of 14-gauge speaker wire. Each roll contains 4 m of wire. For each of 2 speakers, 2 ft. of wire are required. For each of the other 2 speakers, 11 ft. of wire are required. Will the electrician have enough wire? If your answer is no, what length of wire in centimetres will she need? If your answer is yes, what length of wire in centimetres will be left over?

17. A real-estate developer purchased a 30-m by 50-m plot of land to create a mobile home park. The developer sketched this plan:



What is the maximum number of homes the developer can fit on this land?

18. The imperial unit to measure an area of land is the *acre*. During the initial agricultural expansion of the western provinces, the Canadian government offered 160 acres of land free to settlers who were willing to immigrate to Canada. Today, Canada uses the *hectare* to measure land area:

1 hectare $\doteq$ 2.471 acres

a) How many hectares did each settler receive?

b) One hundred sixty acres is a square with a side length of one-half a mile. How many hectares are in one square mile?

Reflect

What strategies do you know for converting a measure in imperial units to a measure in SI units? Include examples in your explanation.

Chapter 1 Measurement, page 2

1.1 Imperial Measures of Length, page 11

3. Answers may vary. For example:
a) Foot **b)** Inch
c) Foot **d)** Inch
e) Mile
4. a) Inch
5. Answers may vary. For example:
a) Foot
7. a) 36 in. **b)** 189 ft.
c) 4 ft.
8. a) 10 560 ft. **b)** 15 yd. 2 ft. 10 in.
c) 1 mi. 703 yd. 1 ft.
9. 165 in. = 4 yd. 1 ft. 9 in.
10. a) 52 ft. = 17 yd. 1 ft. **b)** $197.82
11. a) 24 mats
12. No; 21 ft. 9 in. = 7 yd. 9 in.
13. 10 in.
14. a) 39 ft. 2 in. **b)** 4 rolls
c) $49.96
15. a) $119.99 **b)** $18.59
16. 1062 ft.
17. 62 mi.
18. 28 tulip bulbs
19. 2 mi. 80 yd.
20. 1:2 349 000
21. a) $351 000
22. $158 400 000

1.2 Math Lab: Measuring Length and Distance, page 15

3. Calipers require a steady hand to ensure an accurate reading. Calipers cannot be used for large measures.

1.3 Relating SI and Imperial Units, page 22

Answers will vary depending on the conversion ratios used.

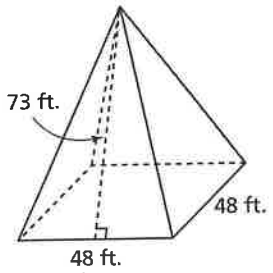
4. a) 40.6 cm **b)** 1.2 m
c) 4.6 m **d)** 1.5 km
e) 9.7 km **f)** 50.8 mm
5. a) 1 in. **b)** 8 ft.
c) 11 yd. **d)** 93 mi.
6. a) 55.9 cm **b)** 256.5 cm
c) 9.6 m
7. a) **i)** 2 ft. 6 in. **ii)** 3 yd.
iii) 6 mi.
8. 100.6 m by 54.9 m
9. Tennessee River
10. The odometer is accurate; 142 km is close to 87 mi.
11. a) The warehouse
12. a) Michael
13. a) CN Tower: approximately 1815 ft.;
Willis Tower: approximately 442.3 m
b) CN Tower **c)** 111 m; 364 ft.
14. 144 sections of casing
15. 28 in.
16. Yes; approximately 8 cm
17. 7 homes
18. a) Approximately 65 hectares
b) Approximately 259 hectares

Chapter 1: Checkpoint 1, page 25

3. a) 26 yd. 2 ft. **b)** 5280 yd.
c) 84 in.
4. Sidney
7. Answers will vary depending on the conversion ratios used.
a) 14 yd. 1 ft. **b)** 122 cm
c) 1 mi. 427 yd. **d)** 273 yd. 1 ft. 3 in.
e) 330.2 m **f)** 5 ft. 9 in.
8. 10 ft. of laminate

1.4 Surface Areas of Right Pyramids and Right Cones, page 34

4. a) 132 in.^{2} **b)** 220 cm^2
5. a) 168 in.^{2} **b)** 294 cm^2
6. a) 101 in.^{2} **b)** 1649 cm^2
7. a) 151 in.^{2} **b)** 2356 cm^2
8. a) 896 cm^2 **b)** 628 yd.^{2}
9. a)



b) 7008 ft.^{2}