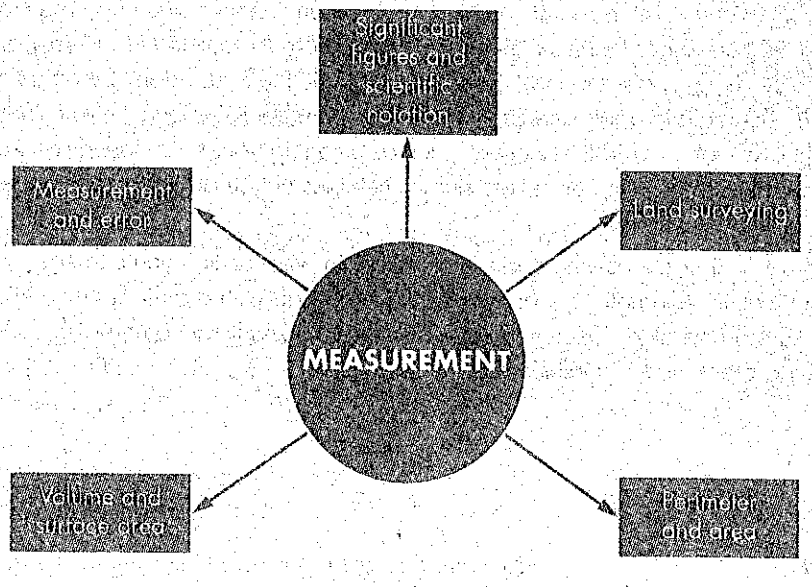
5. CHAPTER SUMMARY

This chapter, Measurement, builds on the measurement work covered in Years 9 and 10. You examined the perimeters, areas, surface areas, volumes and capacities of more complex and composite shapes, including sectors, prisms, cylinders and spheres. Offset surveys and the trapezoidal rule were used to approximate areas of irregular shapes. You should have a good understanding of error in measurement, significant figures and scientific notation. There are many formulas in this chapter, so be sure to include them in your topic summary along with appropriate diagrams and examples.

Make a summary of this topic. Use the outline at the start of this chapter as a guide. An incomplete mind map is shown below. Use your own words, symbols, diagrams, boxes and reminders. Gain a 'whole picture' view of the topic and identify any weak areas.



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5. TEST YOURSELF

1 Convert:

a 28.5 km to m **b** 6.4 t to kg **c** 340 mL to L.

Exercise 5.01

2 Farmer Joe's dam holds 43 ML of water. How many kilolitres does it hold?

Exercise 5.01

3 The width of a room is measured as 3.66 m. Find:

a the absolute error of this measurement

b the limits of accuracy of this measurement

c the percentage error, correct to two decimal places.

Exercise 5.02

4 Write each value correct to two significant figures.

a 38.915 **b** 1036 **c** 0.008 72 **d** 6 587 200

Exercise 5.03

5 A bank has \$8 350 000 000 in its vault. Write this value in scientific notation.

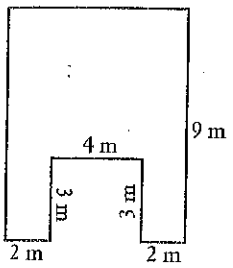
Exercise 5.04

6 A cell is 4.6×10^{-6} mm in diameter. Write this in normal decimal notation.

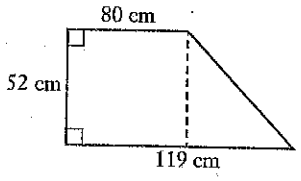
Exercise 5.05

7 Calculate the perimeter of each shape (correct to two decimal places for shape **c**).

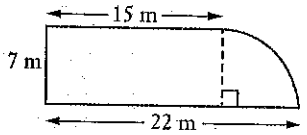
a



b



c



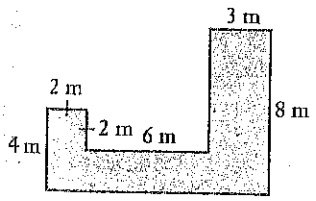
8 Convert:

a 8400 mm^2 to cm^2 **b** 5.6 ha to m^2.

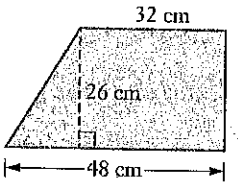
Exercise 5.06

9 Calculate the area of each shape (correct to two significant figures for shape **c**).

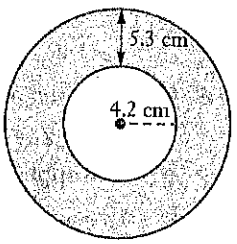
a



b



c



Exercise 5.06

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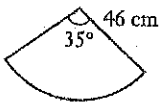
5.06

10 For this sector, calculate correct to one decimal place:



a its perimeter

b its area.

5.07

11 Felix completed an offset survey on a field, *PQRST*, and recorded the entries on the right in his notebook. Draw a diagram of the field and calculate its area:

			S
R	16	52	
Q	10	32	
		24	15 *T*
		0	
			P

a in m^2 **b** in ha.

5.08

12 Convert:

a 20.7 cm^3 to mm^3 **b** 1 650 000 cm^3 to m^3.

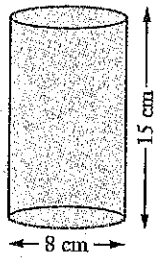
5.08

13 For each closed solid find, correct to two significant figures:

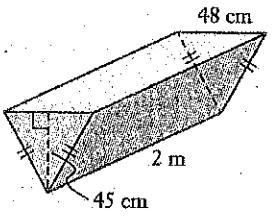
i the volume **ii** the surface area

5.09

a



b



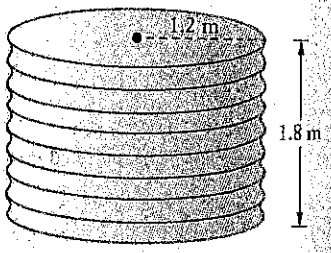
5.08

14 **a** How many millilitres will a container of volume 894 cm^3 hold?

b How many litres will a container of volume 6.5 m^3 hold?

5.09

15 This water tank has the shape of a cylinder. Find correct to two significant figures:

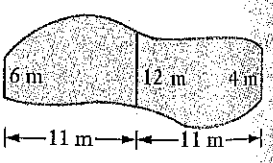


a its volume in cubic metres

b its capacity in litres.

5.07

16 Find the area of this field, correct to the nearest square metre, using:



a one application of the trapezoidal rule

b two applications of the trapezoidal rule.

Which answer is more accurate? Why?

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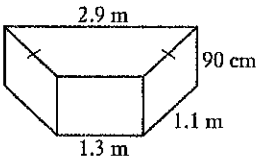
	S		
R 16	52		
Q 10	32		
	24	15	T
	0		
	P		

17 Blocks of concrete are used in the construction of a sports stadium. One of the blocks is shown in the diagram. Calculate, correct to one decimal place:



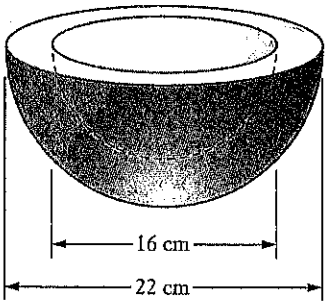
a its surface area **b** its volume.

Exercise 5.08

18 A large stainless steel cylinder for storing wine is 7 m high and has a diameter of 2.8 m. How many full 750 mL bottles of wine can be filled from this container?

Exercise 5.09

19 Rosemary is having a party and decides to make an 'ice bowl' to hold punch. She freezes water in the space between two hemispherical bowls of diameter 16 cm and 22 cm. Find, correct to two decimal places:

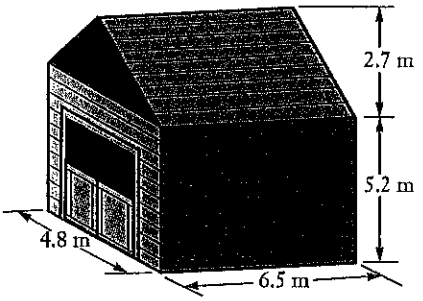


a the volume of ice used to make the bowl

b how many litres of punch the ice bowl will hold.

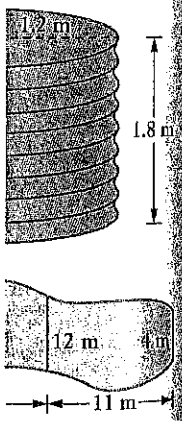
Exercise 5.10

20 **a** Find the volume of the barn shown.

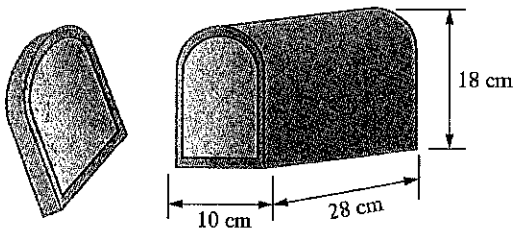


b If the barn is to be painted and one litre of paint covers 14 m^2, how much paint (rounded up to the nearest whole litre) do you need to put two coats on the barn?

Exercise 5.11



21 A 'hi-top' loaf of bread is cut into thick slices in the shape of a rectangle combined with a semicircle. Find, correct to two significant figures:



a the volume of the loaf

b the length of crust on one slice of bread.

Chapter quiz

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Exercise 5.11

1 **a** 994 020 mm^3 **b** 66.7%
c 1 265 620 mm^3
d It is the most efficient packaging as it has the least amount of air.

2 **a** 716 000 mm^3 **b** 1593 cm^3
c 7% **d** 86 200 mm^2

3 **a** 8400 cm^3 **b** 3200 cm^2
c 1200 m^3 **d** 410 cm^2

4 **a** 42 103 L; 4800 L **b** 2nd pool by 5897 L
c 73 m^2

5 **a** 0.31 m^3 **b** 33.4 cm^2
c 460.8 m^2

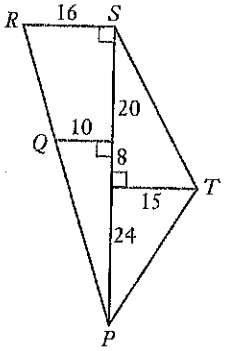
Sample HSC problem

a 3 **b** 20.65 m to 20.75 m
c 0.242%

Solutions

Test yourself 5

1 **a** 28 500 **b** 6400 **c** 0.34
2 43 000
3 **a** ±0.005 **b** 3.655 m to 3.665 m
c 0.14%
4 **a** 39 **b** 1000 **c** 0.0087
d 6 600 000
5 8.35×10^9 **6** 0.000 004 6
7 **a** 40 m **b** 316 cm **c** 55.00 cm
8 **a** 84 cm^2 **b** 56 000 m
9 **a** 44 m^2 **b** 1040 cm^2 **c** 230 cm^2
10 **a** 120.1 cm **b** 646.3 cm^2
11 **a** 810 m^2 **b** 0.081 ha



12 **a** 20 700 mm^3 **b** 1.65 m^3
13 **a** **i** 750 cm^3 **ii** 480 cm^2
b **i** 0.22 m^3 or 220 000 cm^3
ii 3.2 m^2 or 32 000 cm^2
14 **a** 894 mL **b** 6500 L
15 **a** 8.1 m^3 **b** 8100 L
16 **a** 110 m^2 **b** 187 m^2
c 187 m^2 is more accurate, because by using two applications we use more trapeziums to approximate the area more accurately.
17 **a** 8.9 m^2 **b** 1.4 m^3
18 57 470
19 **a** 1715.31 cm^3 **b** 1.07 L
20 **a** 204 m^3 **b** 26 L
21 **a** 4700 cm^3 **b** 52 cm

Chapter 6

SkillCheck

1 **a** 2.25 **b** 4050
2 143 c/L
3 **a** 84 mm **b** 9.6 m **c** 36 L
d 2.61 kL **e** 5200 L **f** 11 min
4 $466.24
5 90 days
6 $4.88
7 **a** $5.18 **b** 13 min

Exercise 6.01

1 **a** $110.19 **b** $314.46
2 B
3 **a** 21 days **b** quarterly
c water and sewerage service, $142.75
d 18 kL
e No, in cooler months fewer showers, water garden less
f similar usage so can compare savings made for conditions
g $\frac{18\,000}{19+30+8+31} = 204.545... = 205$ L
h $2.115/kL **i** $18 \times 2.115 = \$38.07$
j $84.60
4 C
5 **a** $50.76 **b** 15.4 kL **c** $306.84

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