CHAPTER 11 – FURTHER MEASUREMENT
Question Booklet

EXERCISE 11B.2

1 Find the surface area of a cube with sides of length:
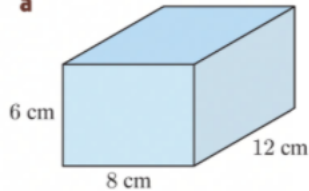
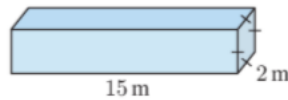   **a** 3 cm   **b** 2 mm   **c** 1.5 m

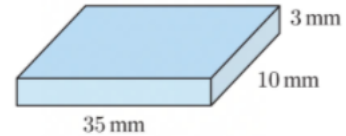**2** Find the surface area of the following rectangular prisms:

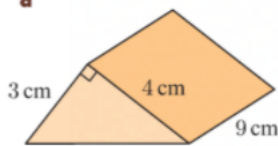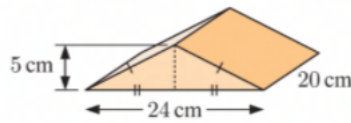   **a** 6 cm, 8 cm, 12 cm

    b 15 m, 2 m

    c 3 mm, 10 mm, 35 mm

3 Find the surface area of the following triangular prisms:

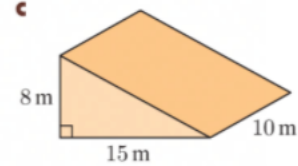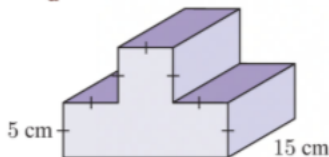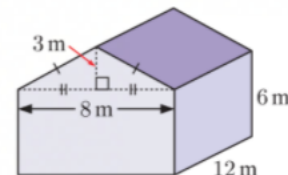   **a** 3 cm, 4 cm, 9 cm

    b 5 cm, 24 cm, 20 cm

    c 8 m, 15 m, 10 m

4 Find the surface area of the following prisms:

    a 5 cm, 15 cm

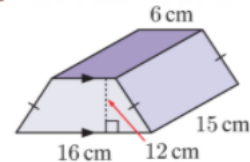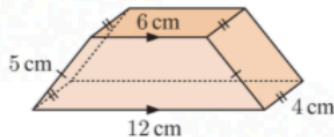   **b** 3 m, 8 m, 6 m, 12 m

    c 6 cm, 16 cm, 12 cm, 15 cm

5 A cellar has dimensions 4 m by 3 m by 2.4 m high. Find the cost of painting the walls and ceiling of the cellar if 1 litre of paint costs $24.90 and each litre covers 15 square metres.

6 A box for a printer cartridge has the dimensions shown. Find the area of cardboard needed to make the box.

    6 cm, 5 cm, 12 cm, 4 cm

7 A greenhouse shown is made from plastic sheeting which costs $4.50 per m². The greenhouse has no floor.

Find the total cost of the plastic sheeting.

    0.5 m, 2 m, 2.4 m, 4 m
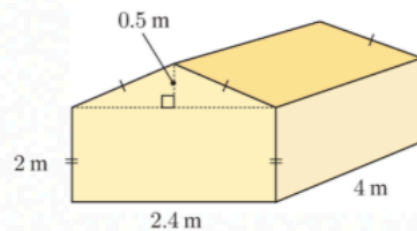
EXERCISE 11B.3

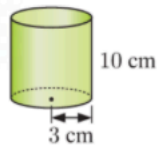**1** Find, correct to 3 significant figures, the outer surface area of the following cylinders:

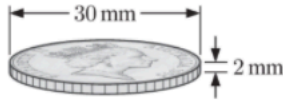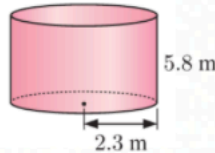**a** hollow throughout   **b** solid   **c** can (no top)

10 cm

3 cm

50 cm

10 cm

4 cm

3.5 cm
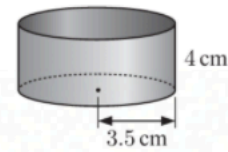
d solid   **e** tank (no top)   **f** hollow throughout

30 mm

2 mm

5.8 m

2.3 m

8 cm

60 cm

2

11 cm

25 cm
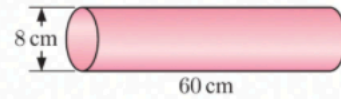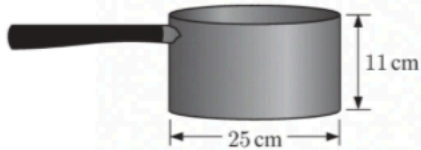
What area of sheet metal is needed to make the saucepan shown, excluding the handle?

3 Fernandez has a collection of cylindrical jars with external radius 3 cm and height 10 cm. He needs to cover the curved side of each jar with a label.

   a If he has 2 square metres of sticky paper for the labels, how many jars can he cover?

   b What assumption have you made in your calculation in **a**?

4 Determine how much paint is required to paint the outside of this tank, if each litre of paint covers 15 square metres.

12 m

10 m
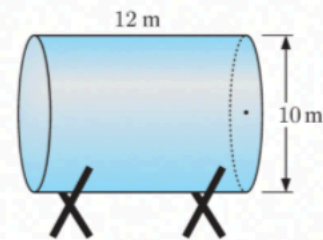
EXERCISE 11C.1

1 State which units of volume would be most suitable to measure the space occupied by:

   a a can of tuna   **b** a house   **c** a stapler

   d a small bead   **e** a swimming pool   **f** an eraser

   g a mountain   **h** a book   **i** a grain of sand

2 Convert:

   a $34\,000$ mm^3 to cm^3 **b** 7.9 m^3 to cm^3 **c** 6.1 mm^3 to cm^3

   d $2\,820\,000$ cm^3 to mm^3 **e** 496 cm^3 to mm^3 **f** 8×10^{10} cm^3 to m^3

   g $57\,700$ mm^3 to cm^3 **h** 1700 cm^3 to mm^3 **i** 0.074 m^3 to mm^3

3 There are 900 cm^3 of rice in a bag. If each grain of rice has a volume of approximately 10 mm^3, estimate the number of rice grains in the bag.

EXERCISE 11C.2

1 Find the volume of the following rectangular prisms:

a

6 m
2 m
8 m

b

7 mm

c

6 mm
5 cm
4 cm
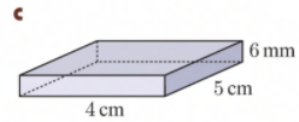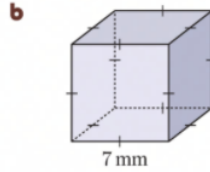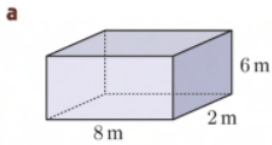
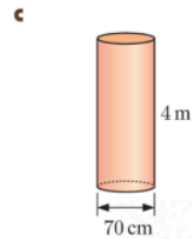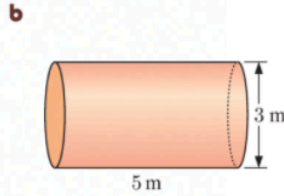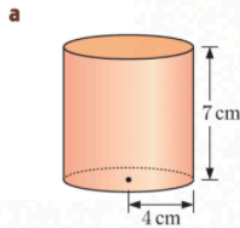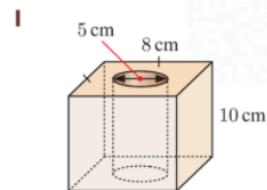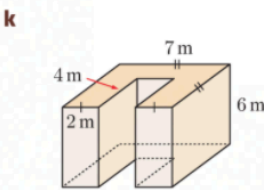**2** Find, correct to 3 significant figures, the volume of the following cylinders:

a

7 cm
4 cm

b

3 m
5 m

c

4 m
70 cm

3 Find, correct to 3 significant figures where necessary, the volume of the following solids:

a

5 cm
area = 12 cm²

b

8.5 m
area = 32 m²

c

5 m
area = 16.5 m²

d

6 cm
8 cm
7 cm

e

area = 6.5 m²
0.4 m

f

9 cm
8 cm
12 cm
11 cm

g

1.5 m
0.04 m

h

16 cm
32 cm
64 cm

i

20 mm
25 mm
30 mm

j

2 m
8 m
3 m
6 m

k

7 m
4 m
2 m
6 m

l

5 cm
8 cm
10 cm
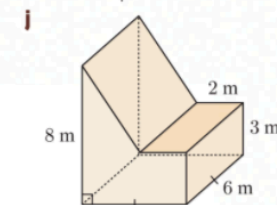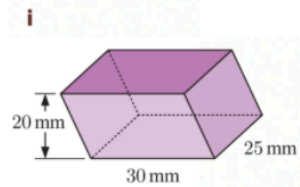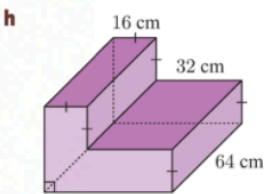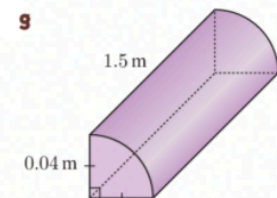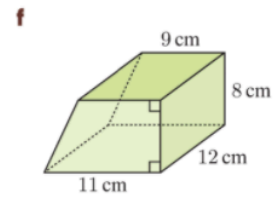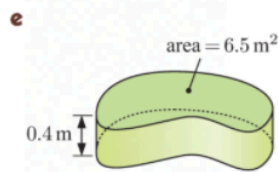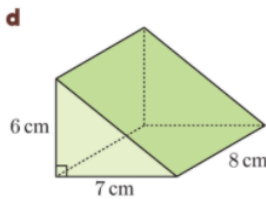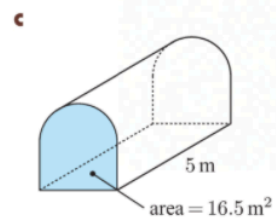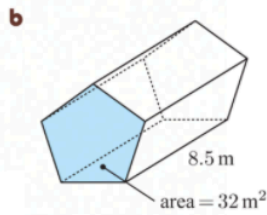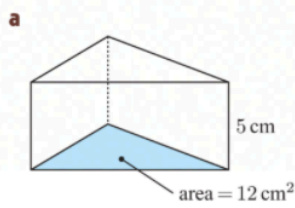
4 Find the volume of soil that can fit into this cylindrical pot.

15 cm
12 cm

5

5 m
1.2 m
1.5 m
15 m
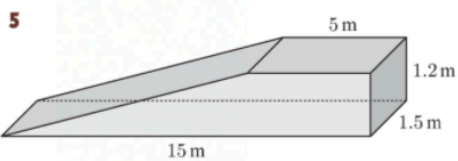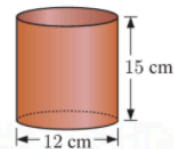
Find the volume of concrete required to make this ramp.

6 **a** Find the volume of air inside this letter box.
b Three rectangular envelopes with dimensions 23 cm by 12 cm by 5 mm are placed inside the letter box. What volume of air remains inside the letter box?

15 cm
LETTERS
10 cm
24 cm

3
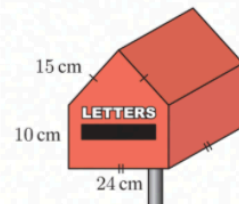
EXERCISE 11E.1

1 Convert the following times to days:

    a 624 hours   **b** 10 800 min   **c** 4 years   **d** 8 hours

2 Convert the following times to minutes:

    a 6 hours   **b** 5 days   **c** 2 days 18 hours

    d 3 days 1 hour 12 minutes   **e** 1 week 2 days 4 hours

3 Convert the following times to seconds:

    a 25 minutes   **b** 4 hours 27 min   **c** 6 days   **d** 2 weeks 1 day

4 Christian attends 4 gym sessions per week, each of 45 minutes duration. Find the total time Christian spends at the gym over a 15 week period.

5 Find the time difference between:

    a 2:30 am and 7:45 am   **b** 11:20 am and 4:42 pm

    c 5:25 pm and 10:05 pm   **d** 9:38 am and 1:40 pm

6 James left home at 7:15 am. He caught a bus and a train to get to work, and arrived at 8:58 am. How long did it take James to get to work?

7 Anthea worked the following hours last week:

Monday	8:30 am - 4:15 pm
Tuesday	8:25 am - 4:30 pm
Wednesday	8:45 am - 4:45 pm
Thursday	9:00 am - 5:05 pm
Friday	8:40 am - 4:45 pm

   **a** How many hours did Anthea work last week?

    b Anthea's pay rate is $19 per hour. What was Anthea's income for last week?

8 Calculate the time:

    a 4 hours after 6:24 am   **b** 5 hours before 7:41 am

    c $8\frac{1}{2}$ hours after 9:20 am   **d** $2\frac{1}{2}$ hours before 12:10 pm

9 Evan started a bushwalk at 8:20 am. He hiked for $5\frac{1}{2}$ hours before arriving at his destination. At what time did he arrive?

10 A waiter finished his $6\frac{1}{2}$ hour shift at 11:15 pm. At what time did he start his shift?

Review set 11

2 Find the surface area of:

    a   **b**   **c** open at the top
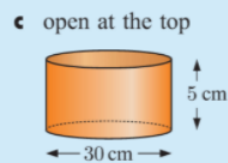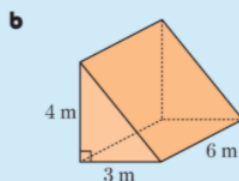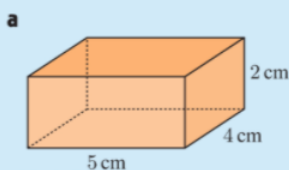
4 Convert:

    a 2.8 m³ to cm³   **b** 4200 cm³ to L   **c** 1.1 cm³ to mm³.

5 Find the volume of:

    a   **b**   **c**
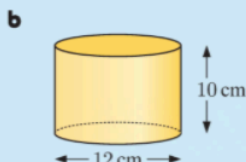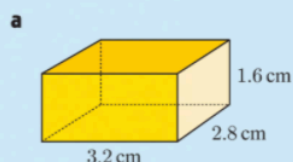
6 A semi-circular tunnel with the dimensions shown is made of concrete.

    a Find the cross-sectional area of the tunnel.

    b If the tunnel is 200 m long, and concrete costs $120 per cubic metre, find the cost of the concrete for the tunnel.
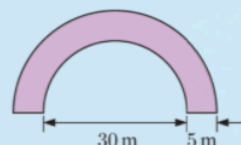
8 Convert: **a** 256 hours to days and hours   **b** 2 hours 19 minutes to seconds.

9 How much time is there between 3:49 am and 2:13 pm?

CHAPTER 11 – FURTHER MEASUREMENT
Solutions

EXERCISE 11B.2

1 **a** 54 cm^2 **b** 24 mm^2 **c** 13.5 m^2

2 **a** 432 cm^2 **b** 128 m^2 **c** 970 mm^2

3 **a** 120 cm^2 **b** 1120 cm^2 **c** 520 m^2

4 **a** 950 cm^2 **b** 480 m^2 **c** 984 cm^2

5 $99.60   **6** 184 cm^2 **7** $167.40

EXERCISE 11B.3

1 **a** $\approx$ 188 cm^2 **b** $\approx$ 1730 cm^2 **c** $\approx$ 126 cm^2
   d $\approx$ 1600 mm^2 **e** $\approx$ 100 m^2 **f** $\approx$ 1510 cm^2

2 $\approx$ 1355 cm^2

3 **a** 106 jars
   b Assumes that 106 whole labels can be cut (without joins).

4 $\approx$ 35.6 L

EXERCISE 11C.1

1 **a** cm^3 **b** m^3 **c** cm^3 **d** mm^3 **e** m^3
   f cm^3 **g** m^3 **h** cm^3 **i** mm^3

2 **a** 34 cm^3 **b** 7 900 000 cm^3
   c 0.0061 cm^3 **d** 2 820 000 000 mm^3
   e 496 000 mm^3 **f** 80 000 m^3
   g 57.7 cm^3 **h** 1 700 000 mm^3
   i 74 000 000 mm^3

3 90 000 rice grains

EXERCISE 11C.2

1 **a** 96 m^3 **b** 343 mm^3 **c** 12 cm^3

2 **a** $\approx$ 352 cm^3 **b** $\approx$ 35.3 m^3 **c** $\approx$ 1.54 m^3

3 **a** 60 cm^3 **b** 272 m^3 **c** 82.5 m^3
   d 168 cm^3 **e** 2.6 m^3 **f** 960 cm^3
   g $\approx$ 0.001 88 m^3 **h** $\approx$ 65 500 cm^3 **i** 15 000 mm^3
   j 168 m^3 **k** 222 m^3 **l** $\approx$ 444 cm^3

4 $\approx$ 1696 cm^3 **5** 18 m^3

6 **a** 8352 cm^3 **b** $\approx$ 7938 cm^3

EXERCISE 11E.1

1 **a** 26 days   **b** 7.5 days   **c** 1461 days   **d** $\frac{1}{3}$ day

2 **a** 360 min   **b** 7200 min   **c** 3960 min
   d 4392 min   **e** 13 200 min

3 **a** 1500 s   **b** 16 020 s   **c** 518 400 s   **d** 1 296 000 s

4 45 hours

5 **a** 5 h 15 min   **b** 5 h 22 min   **c** 4 h 40 min
   d 4 h 2 min

6 1 h 43 min   **7** **a** 40 h   **b** $760

8 **a** 10:24 am   **b** 2:41 am   **c** 5:50 pm   **d** 9:40 am

9 1:50 pm   **10** 4:45 pm

REVIEW SET 11

2 **a** 76 cm^2 **b** 84 m^2 **c** $\approx$ 1178 cm^2

4 **a** 2 800 000 cm^3
   b 4.2 L
   c 1100 mm^3

5 **a** $\approx$ 14.3 cm^3 **b** $\approx$ 1130 cm^3 **c** 195 cm^3

6 **a** $\approx$ 275 m^2 **b** $\approx$ $6 600 000

8 **a** 10 days 16 hours   **b** 8340 seconds

9 10 h 24 min