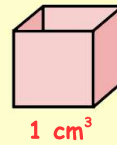


Liquid Volume - Capacity

Be able to find the capacity of a container and convert from l to ml

If you have a hollow cube measuring 1 cm by 1 cm by 1 cm, it has a volume of $1 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 1 \text{ cm}^3$.

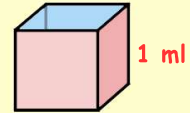


1 cm³

If you now fill that small cube with water, it holds 1 cm³.

- cm³ are usually used to define the **volume** of a solid shape.

Liquid volume is measured in **millilitres** where 1 millilitre = 1 cm³.

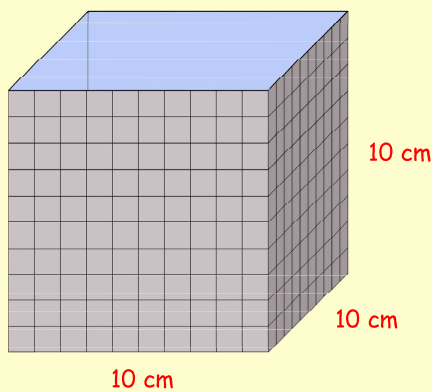
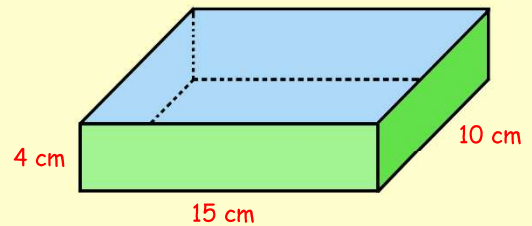


1 ml

Another name for **liquid volume** is **capacity**. We say the cube has a **capacity** of 1 millilitre (1 ml).

Example :- This hollow container is filled with water.

Its volume is $V = L \times B \times H$
 $V = 15 \times 10 \times 4 = 600 \text{ cm}^3$
 Its **capacity** is $C = 600 \text{ ml}$



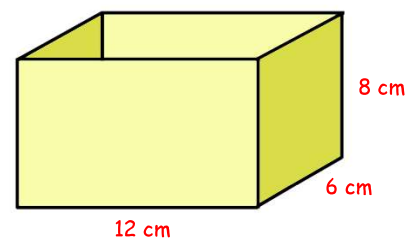
Note :- This box measures 10 cm by 10 cm by 10 cm

Its volume is $V = L \times B \times H$
 $V = 10 \times 10 \times 10 = 1000 \text{ cm}^3$
 Its **capacity** is $C = 1000 \text{ ml}$ or 1 litre.

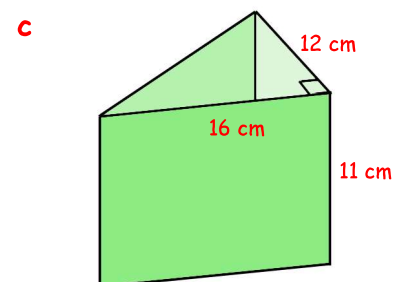
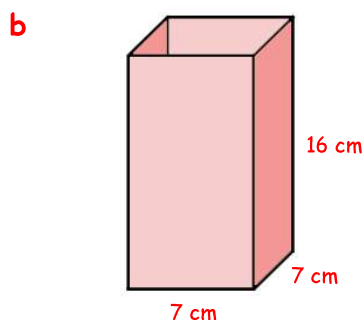
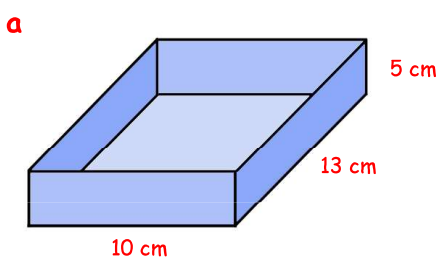
$1 \text{ litre} = 1000 \text{ millilitres}$ (1 L = 1000 ml).

Exercise 3

- Calculate the **volume** of this box in cm³.
 - Now write down its **capacity** in ml.



- Determine the **capacity** of these three containers :-



3. Change the following from **litres** to **millilitres** :- (Remember :- **1 litre = 1000 ml**).

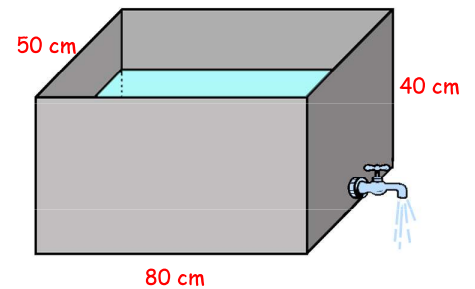
- | | | | |
|-----------------------|-------------------------|-------------------------|--------------------------|
| a 2 litres | b 5 litres | c 8 litres | d 25 litres |
| e 3.2 litres | f 12.75 litres | g 0.9 litre | h 11.234 litres |
| i $\frac{1}{2}$ litre | j $4\frac{1}{2}$ litres | k $1\frac{1}{4}$ litres | l $3\frac{3}{4}$ litres. |

4. Change the following from **millilitres** to **litres** :- (Remember :- **1000 ml = 1 litre**).

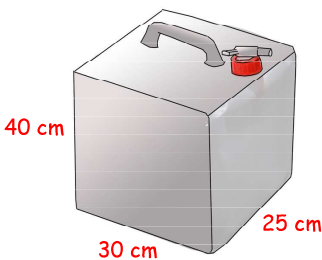
- | | | | |
|-----------|------------|------------|------------|
| a 6000 ml | b 9000 ml | c 15000 ml | d 35000 ml |
| e 2500 ml | f 7250 ml | g 250 ml | h 1300 ml |
| i 4650 ml | j 12620 ml | k 100 ml | l 15 ml. |

5. This cold storage water tank measures 80 cm by 50 cm by 40 cm.

- a Calculate its **volume** in cm^3 .
- b Calculate its **capacity** when full of water :-
 (i) in **millilitres** (ii) in **litres**.



6. Scouts use large containers like this to store their drinking water to allow them to replenish their drinks bottles.

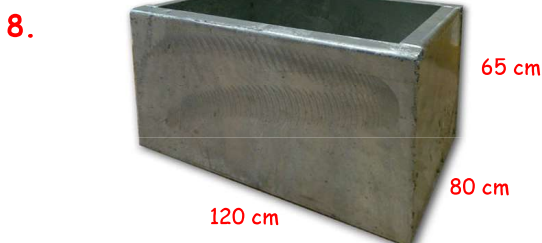
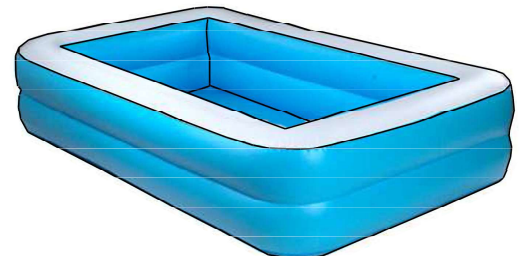


- a Calculate the **capacity** of the large container in **litres**.
- b How many drinks bottles can be filled from a full container ?



7. The inside of this rectangular paddling pool is a cuboid measuring 2.4 m by 1.5 m by 80 centimetres deep.

- a Change 2.4 m and 1.5 m each to centimetres.
- b Calculate the **volume** of the inside of the pool in cm^3 .
- c How many **litres** of water will it need to **half** fill it ?



Water pours into this stainless steel storage tank at a rate of **4 litres per minute**.

How long will it take before the tank overflows ?

9. Shown is a large storage container with its internal dimensions 3 metres by 4 metres by 12 metres.

Calculate the volume of air inside the container and give your answer in litres. (**Not 144 litres**).



Answers to CHAPTER 12 (page 104)**Chapter 12 - Exercise 1 (page 104)**

- 120 cm³
- 343 cm³
- 750 cm³
- a 210 cm³ b 504 cm³ c 440 cm³
d 105 mm³ e 300 m³ f 192 cm³
- a 2700 cm³ b 8640 cm³ c 14400 cm³
d 1000 cm³ e 243 cm³ f 25000 cm³
- a 24 m³ b 98 cm³ c 2.16 cm³
d 2156 cm³ e 42875 mm³ f 27 m³
- a 675 cm³ b 3192 cm³ c 389 cm³
d 3106 cm³ e 19440 mm³ f 7020 cm³
- 4 cm
- a H = 10 cm b B = 5 cm c L = 8 cm

Chapter 12 - Exercise 2 (page 107)

- 210 cm³
- 300 mm³
- 468 cm³
- 1080 cm³
- 450 cm³
- 4 m³
- a 30.1 cm³ b 180.6 cm³
- 3.06 m³
- a 60 cm² b 8.5 cm
- a 560 cm³ b 2160 cm³
c 1860 cm³ d 52500 cm³
- 725000 cm³
- 625 m³
- 156000 cm³

Chapter 12 - Exercise 3 (page 110)

- a 576 cm³ b 576 ml
- a 650 ml b 784 ml c 1056 ml
- a 2000 ml b 5000 ml c 8000 ml
d 25000 ml e 3200 ml f 12750 ml
g 900 ml h 11234 ml i 500 ml
j 4500 ml k 1250 ml l 3750 ml
- a 6 l b 9 l c 15 l
d 35 l e 2.5 l f 7.25 l
g 0.25 l h 1.3 l i 4.65 l
j 12.62 l k 0.1 l l 0.015 l
- a 160000 cm³ b (i) 160000 ml (ii) 160 l
- a 30 l b 60
- a 240 cm and 150 cm
b 2880000 cm³ c 1440 litres
- 2 hr 36 mins
- 144000 litres

Answers to CHAPTER 13 (page 113)**Chapter 13 - Exercise 1 (page 113)**

- £350
- a £342.90 b £312.42 c £30.48
- £103.60
- a Anne - £484.50, Peter - £657.20
b £172.70
- £1732.50
- a £9.78 b 25 hrs c 45 hrs
- a £8.76 b £324.12
- a 150 hrs b £10.20
- Ian - £10.50 per hr, Simon - £10.60 per hr
Simon has a slightly better hourly rate
- Dick = 12 × £1246 = £14952

- Cindy = 52 × £276.25 = £14365
Dick earns £587 more than Cindy.
- £2054
 - a £378 b £19656
 - a Jack - £25800, Jill - £23402.60
b Jack earns £2397.40 more
 - Les - £23091, Den - £20295.60
a Caro earns most
b Den earns least
 - a £300 b £287
c Hugh - £7.50/hr, Joey - £8.20/hr
Joey gets 70p more per hour
 - Job 1 = £7.95 per hour
Job 2 = £8.25 per hour - better rate
 - a £112.50 b £4.50 - (below minimum)
 - Discussion

Chapter 13 - Exercise 2 (page 116)

- £1470
- a £1071 b £23471
- a £0 b £49 c £499.80
- a £1000 b £1100
- a £2 b £18.40 c £45.20
- a £375 b £825.20
- a £8.40 b £27.60 c £28
d £26 e £67.50 f £11
g £17 h £160
- a 45p b £3.75 c £48
d £15 e £96 f £87.50
g £153.60 h £8.60
- a £16848 b £10710 c £31.25
- a ££675 b £20706.40

Chapter 13 - Exercise 3 (page 118)

- a £255 b £672
- £109.20
- £54
- £110
- a £525 b £1725
- £1875 7. £466
- a €1200 b €1224 c €1395
- Tracy - £1400, Edina - £1440 = better
- Alice - £2800, Ben - £3000, Carron - £3300
a Carron - most b Alice - least
- £25000
- Various

Chapter 13 - Exercise 4 (page 120)

- a £64 b £84.60 c £1204.50
d £158.40 e £84 f £153.60
g £756
- a £330.75 b £151.20 c £481.95
- £384
- £712.50
- £261.36
- a £324 b £64.80
c £43.20 d £432
- Basic = £532
Overtime = £147 + £126 = £273
Total pay = £805

Chapter 13 - Exercise 5 (page 122)

- a £13130 b £17590 c £18086.40
- a £16120 b £310
- a £4364.80 b £10835.20
- £449.80
- £2504
- a £1566 b £2684 c £1197
- a £648 b £167.40 c £480.60
- Gross - £528.50, Ded - £138.20,
Net - £390.30

- Gross - £606.90, Ded - £181.96
Net pay = £424.94
- £17575
- £382
- £10000

Answers to CHAPTER 14 (page 125)**Chapter 14 - Exercise 1 (page 125)**

- 50:24 cm²
- a 113.04 cm² b 254.34 cm² c 63.585 cm²
- a 633 mm² b 491 cm² c 0.785 m²
- a 113 cm² b 19.6 m² c 1260 mm²
- a 91.6 cm² b 13.8 cm²
c 3420 mm² d 0.196 m²
- a 8.04 m² b 1.13 m²
c 20.5 m² d 6.68 m²
- a 30 cm b 60 cm

Chapter 14 - Exercise 2 (page 128)

- a 56.5 cm² b 226 mm² c 127 m²
- a 30.8 cm b 61.7 mm c 46.3 m
- a 78.5 cm² b 154 cm² c 0.785 m²
- a 35.7 cm b 50.0 cm c 3.57 m
- a (i) 124 cm² (ii) 48.0 cm
b (i) 235 cm² (ii) 104 cm
c (i) 145 cm² (ii) 50.1 cm
d (i) 89.6 cm² (ii) 45.9 cm
- 11500 cm²
- 31.0 cm²
- a 942 cm² b 18.8 m²
- D = 30 cm, Vol = 8480 cm³
- 56.5 m
- The side of the square is 80 cm
The diameter of the circle is 81.4 cm
The square is not big enough
- a 78.5 cm² b 15.7 cm²
- a 31.4 cm b 6.28 cm
- a 1/8 b 200.96 cm² c 25.12 cm²
d 50.24 cm e 6.28 cm f 22.28 cm
- a 1/3 b 1670 cm² c 83.7 cm
- A = 339 cm², Per = 80.5 cm
- 20.9 cm
- a 141.3 cm² b 51.7 cm

Answers to CHAPTER 15 (page 133)**Chapter 15 - Exercise 1 (page 133)**

- a 32 mph b 7 hr c 310 km
d 200 mph e 18 hr f 10 m
g 50 sec
- 648 km
- 62 km/hr
- 2 hr
- 332 mph
- 8 minutes
- 20 km
- a 140 m/min b 2 mins
- 245 miles per day
- 12400 km per day = 517 km/hr
- a 1200 m/hr b 300 m
- a 50 cm/hr b 3 hours
- 3.55 am Sunday