Year 8 · Measurement: Volumes, Areas & Time

Name: _____ Date: _____

Hi! This sheet lets you practise converting units, finding areas of parallelograms and trapeziums, working out volumes of prisms, and reading timetables. Take your time and show your working.

Warm-up

1. Convert 5 m² into cm².

2. Find the area of a parallelogram with base 8 cm and height 5 cm.

3. Convert 2.5 L into cm³.

4. Convert 2 hours 45 minutes into minutes.

Practice

5. Find the area of a trapezium with parallel sides a = 6 cm and b = 10 cm, and height h = 4 cm.

6. A triangular prism has a triangular cross-section with base 6 cm and height 4 cm, and a length of 10 cm. Find its volume.

7. A parallelogram has an area of 60 cm² and a height of 5 cm. Find the length of its base.

8. Mereana fills a fish tank shaped like a rectangular prism that is 50 cm long, 30 cm wide and 40 cm high. How many litres of water does it hold when full?

9. The train from New Lynn departs at 7:52 am and arrives at Britomart at 8:29 am. How long is the trip, in minutes?

10. A solid is made of two rectangular prisms. The bottom prism is 10 cm × 6 cm × 4 cm and the top prism is 4 cm × 4 cm × 5 cm. Find the total volume.

Challenge

11. A barn-shaped storage shed is a composite prism 10 m long. The lower part is a rectangular prism 4 m wide and 3 m high. On top sits a triangular prism (the roof) with base 4 m and height 2 m. Find the total volume, then write it in litres.

12. A rainwater tank is a rectangular prism 1.2 m long, 0.8 m wide and 1.5 m high. A pump fills it at 15 L per minute. Starting empty, how long will it take to fill completely? Give your answer in hours and minutes.

Answer key (for parents and tutors)

1. Convert 5 m^2 into cm^2.
   1 m^2 = 100 cm × 100 cm = 10 000 cm^2. So 5 m^2 = 5 × 10 000 = 50 000 cm^2.

2. Find the area of a parallelogram with base 8 cm and height 5 cm.
   A = bh = 8 × 5 = 40 cm^2.

3. Convert 2.5 L into cm^3.
   1 L = 1000 cm^3. So 2.5 L = 2.5 × 1000 = 2500 cm^3.

4. Convert 2 hours 45 minutes into minutes.
   2 hours = 2 × 60 = 120 minutes. 120 + 45 = 165 minutes.

5. Find the area of a trapezium with parallel sides a = 6 cm and b = 10 cm, and height h = 4 cm.
   A = ½(a + b)h = ½ × (6 + 10) × 4 = ½ × 16 × 4 = ½ × 64 = 32 cm^2.

6. A triangular prism has a triangular cross-section with base 6 cm and height 4 cm, and a length of 10 cm. Find its volume.
   V = ½bhl = ½ × 6 × 4 × 10 = ½ × 240 = 120 cm^3.

7. A parallelogram has an area of 60 cm^2 and a height of 5 cm. Find the length of its base.
   A = bh, so 60 = b × 5. Divide both sides by 5: b = 60 ÷ 5 = 12 cm.

8. Mereana fills a fish tank shaped like a rectangular prism that is 50 cm long, 30 cm wide and 40 cm high. How many litres of water does it hold when full?
   Volume = length × width × height = 50 × 30 × 40 = 60 000 cm^3. Since 1 L = 1000 cm^3, capacity = 60 000 ÷ 1000 = 60 L.

9. The train from New Lynn departs at 7:52 am and arrives at Britomart at 8:29 am. How long is the trip, in minutes?
   From 7:52 am to 8:52 am would be 60 minutes, but arrival is at 8:29 am. From 7:52 to 8:00 is 8 minutes; from 8:00 to 8:29 is 29 minutes. 8 + 29 = 37 minutes.

10. A solid is made of two rectangular prisms. The bottom prism is 10 cm × 6 cm × 4 cm and the top prism is 4 cm × 4 cm × 5 cm. Find the total volume.
    Bottom prism: 10 × 6 × 4 = 240 cm^3. Top prism: 4 × 4 × 5 = 80 cm^3. Total volume = 240 + 80 = 320 cm^3.

11. A barn-shaped storage shed is a composite prism 10 m long. The lower part is a rectangular prism 4 m wide and 3 m high. On top sits a triangular prism (the roof) with base 4 m and height 2 m. Find the total volume, then write it in litres.
    Rectangular part: V = 4 × 3 × 10 = 120 m^3. Triangular roof: V = ½bhl = ½ × 4 × 2 × 10 = 40 m^3. Total = 120 + 40 = 160 m^3. Since 1 m^3 = 1000 L, volume = 160 × 1000 = 160 000 L.

12. A rainwater tank is a rectangular prism 1.2 m long, 0.8 m wide and 1.5 m high. A pump fills it at 15 L per minute. Starting empty, how long will it take to fill completely? Give your answer in hours and minutes.
    Volume = 1.2 × 0.8 × 1.5 = 1.44 m^3. Convert to litres: 1.44 × 1000 = 1440 L. Time = 1440 ÷ 15 = 96 minutes. 96 minutes = 60 + 36 = 1 hour 36 minutes.