CALCULATOR ALLOWED | Advanced level questions | 25 MIN

Mini Test 27: Perimeter, Area and Volume

1 The area of a rectangle is 144 cm^2.
The length is 16 cm.
What is the width? ☐ cm

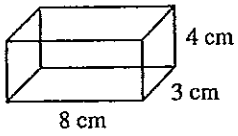
2 The dimensions of a small rectangular prism are half those of a larger rectangular prism. The volume of the larger prism is 32 cubic metres. What is the volume of the smaller prism in cubic metres?
A 16 **B** 8 **C** 4 **D** 2

3 The area of a square is 121 square centimetres. What is the perimeter? ☐ cm

4 The perimeter of a rectangle is 28 cm. If the width is 5 cm, what is the area?
A 45 cm^2 **B** 70 cm^2
C 90 cm^2 **D** 115 cm^2

5 The length of a rectangular prism is 6 m and the width is 5 m. The volume is 90 m^3. What is the height? ☐ m

6 What is the total area of all the faces of this prism?



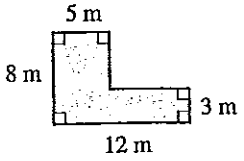
☐ cm^2

7 A rectangle is twice as long as it is wide. Which correctly completes the statement: 'The perimeter is ...'?
A 2 times the width. **B** 6 times the width.
C 8 times the width. **C** 12 times the width.

8 A regular octagon with sides of length 6 cm is made from a piece of wire. If the wire is straightened and then bent to form a square, what is the area of the square? ☐ cm^2

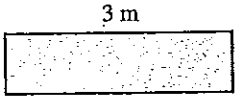
9 Turf is sold in rolls. Each roll is 50 cm wide and, when unrolled, the turf is 3 m long. How many rolls of turf will be needed to cover a rectangular yard that is 20 m long and 12 m wide? ☐

10 The diagram shows a plan of the floor of a room.

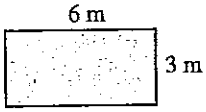


What is the area of the floor? ☐ m^2

11 What is the area of this rectangle?
A 240 cm^2
B 2.4 m^2
C 24 m^2
D 240 m^2



12 The diagram shows the top view of a swimming pool, which is filled to a depth of 1.2 m.



Given that 1 m^3 = 1000 L, how many litres of water will the pool hold? ☐ L

13 The total area of all the faces of a cube is 96 m^2.
What is the volume of the cube? ☐ m^3

14 The area of a square is 289 cm^2.
What is the perimeter of the square? ☐ cm

15 Two rectangular prisms have the same volume. The first prism is 5 m long, 4 m wide and 3 m high. What could **not** be the dimensions of the second prism?
A 6 m by 5 m by 2m
B 10 m by 3 m by 2 m
C 15 m by 2 m by 2 m
D 7 m by 3 m by 3 m

16 The area of a rectangle is 48 cm^2.
The width of the rectangle is 6 cm.
What is the perimeter of the rectangle? ☐ cm

Answers and explanations on pages 122–124

Mini Test 27: Perimeter, Area and Volume

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1 9 cm **2** C **3** 44 cm **4** A **5** 3 m **6** 136 cm^2
7 B **8** 144 cm^2 **9** 160 **10** 61 m^2 **11** B
12 21 600 L **13** 64 m^3 **14** 68 cm **15** D **16** 28 cm

1 Area = length × width
So 16 × width = 144
width = 144 ÷ 16
= 9
The width is 9 cm.

2 Each dimension has been halved.
Number of times smaller = 2 × 2 × 2
= 8
Larger volume = 32 m^3
Smaller volume = 32 m^3 ÷ 8
= 4 m^3

3 The area is 121 cm^2.
Now $11^2 = 121$
So each side of the square is 11 cm.
Perimeter = 4 × 11 cm
= 44 cm

4 Perimeter = 28 cm
So 2 × (length + width) = 28 cm
length + width = 14 cm
But the width is 5 cm.
So the length = 14 cm − 5 cm
= 9 cm
Area = length × width
= 9 cm × 5 cm
= 45 cm^2

5 Volume = length × width × height
So 6 × 5 × height = 90
30 × height = 90
height = 90 ÷ 30
= 3
The height is 3 m.

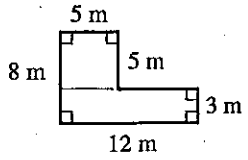
6 Two faces are 8 cm by 3 cm.
Area of each = 8 cm × 3 cm
= 24 cm^2
Two faces are 8 cm by 4 cm.
Area of each = 8 cm × 4 cm
= 32 cm^2
Two faces are 3 cm by 4 cm.
Area of each = 3 cm × 4 cm
= 12 cm^2
Total area = 2 × (24 + 32 + 12) cm^2
= 2 × 68 cm^2
= 136 cm^2

7 Length = 2 × width
Perimeter = 2 × (length + width)
= 2 × (2 × width + width)
= 2 × (3 × width)
= 6 × width

8 A regular octagon has 8 equal sides.
So the length of the wire = 8 × 6 cm
= 48 cm
A square has 4 equal sides.
Each side = 48 cm ÷ 4
= 12 cm
Area = 12 cm × 12 cm = 144 cm^2

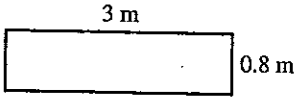
9 Each roll is 3 m long and the yard is 12 m wide.
Now 12 ÷ 3 = 4
So 4 rolls will fit across the yard in a strip 50 cm wide.
1 m = 100 cm
So 2 strips will cover each metre of the length.
Number of strips = 20 × 2
= 40
Total rolls = 4 × 40 = 160

10 Divide the shape into 2 rectangles.



Area = 5 m × 5 m + 12 m × 3 m
= 25 m^2 + 36 m^2 = 61 m^2

11 [The units must be the same for both the length and width.]
80 cm = 0.8 m



Area = length × width
= 3 m × 0.8 m = 2.4 m^2

12 Volume = length × width × height
= 6 m × 3 m × 1.2 m
= 21.6 m^3
Each cubic metre holds 1000 litres.
Capacity = 21.6 × 1000 L
= 21 600 L

13 A cube has 6 identical faces.
Area of each face = 96 m^2 ÷ 6
= 16 m^2
Each side = $\sqrt{16}$ m
= 4 m
Volume = 4 m × 4 m × 4 m
= 64 m^3

14 Area = 289 cm^2
Each side = $\sqrt{289}$ cm
= 17 cm
Perimeter = 4 × 17 cm
= 68 cm

15 Volume = length × width × height
= 5 m × 4 m × 3 m
= 60 m^3
Now consider each option:
6 m × 5 m × 2 m = 60 m^3
10 m × 3 m × 2 m = 60 m^3
15 m × 2 m × 2m = 60 m^3
7 m × 3 m × 3 m = 63 m^3
The dimensions of the prism could not be 7 m × 3 m × 3 m.

16 Area = length × width
So length × 6 cm = 48 cm^2
length = 48 cm^2 ÷ 6 cm
= 8 cm
Perimeter = 2 × (8 cm + 6 cm)
= 2 × (14 cm)
= 28 cm