Marking guide | Circles, area and volume

Circles, area and volume - topic test

15 questions | 37 marks | 45 minutes

A progressive paper covering circle formulas, composite regions, units, cross-sections, volume and practical capacity.

Equivalent correct methods earn the corresponding marks.

1. A circle has radius 7 cm. State its diameter. [1 mark]

$d = 2(7) = 14$ cm.

Answer: 14 cm.

2. Find the circumference of a circle with radius 4 cm. Leave π in the answer. [2 marks]

$C = 2\pi(4) = 8\pi$ cm.

Answer: 8π cm.

3. A circle has diameter 12 m. Find its area exactly. [2 marks]

Radius is 6 m.

$A = \pi(6)^2 = 36\pi$ m².

Answer: 36π m².

4. Convert 1.8 m² to cm². [2 marks]

$1.8 \times 10000 = 18000$ cm².

Answer: 18,000 cm².

5. A triangle has base 9 cm and perpendicular height 4 cm. Find its area. [2 marks]

$A = \frac{1}{2}(9)(4) = 18$ cm².

Answer: 18 cm².

6. Find the area of a semicircle with radius 5 cm. [2 marks]

$A = \frac{1}{2}\pi(5)^2 = \frac{25\pi}{2}$ cm².

Answer: $\frac{25\pi}{2}$ cm².

7. Find the full perimeter of a semicircle with diameter 10 cm. [3 marks]

Radius is 5 cm.

Curved edge is 5π cm and straight edge is 10 cm.

Answer: $(5\pi + 10)$ cm.

8. A 10 m by 7 m rectangle has a 3 m by 2 m corner removed. Find the remaining area. [2 marks]

$10(7) - 3(2) = 70 - 6 = 64$ m².

Answer: 64 m².

9. Find the volume of a rectangular prism 6 cm by 5 cm by 4 cm. [2 marks]

$V = 6(5)(4) = 120$ cm³.

Answer: 120 cm³.

10. A triangular prism has end base 8 cm, end perpendicular height 3 cm and length 5 cm. Find its volume. [3 marks]

End area is $\frac{1}{2}(8)(3) = 12$ cm².

Volume is $12(5) = 60$ cm³.

Answer: 60 cm³.

11. Find the volume of a cylinder with radius 3 cm and height 8 cm. Give an exact answer. [2 marks]

$V = \pi(3)^2(8) = 72\pi$ cm³.

Answer: 72π cm³.

12. A prism has volume 84 cm³ and cross-sectional area 12 cm². Find its length. [2 marks]

$L = \frac{V}{A} = \frac{84}{12} = 7$ cm.

Answer: 7 cm.

13. A tank has internal dimensions 1 m by 0.6 m by 0.5 m. It is half full. How many litres of water are in it? [3 marks]

Full volume is $1(0.6)(0.5) = 0.3$ m³, or 300 L.

Half of 300 L is 150 L.

Answer: 150 L.

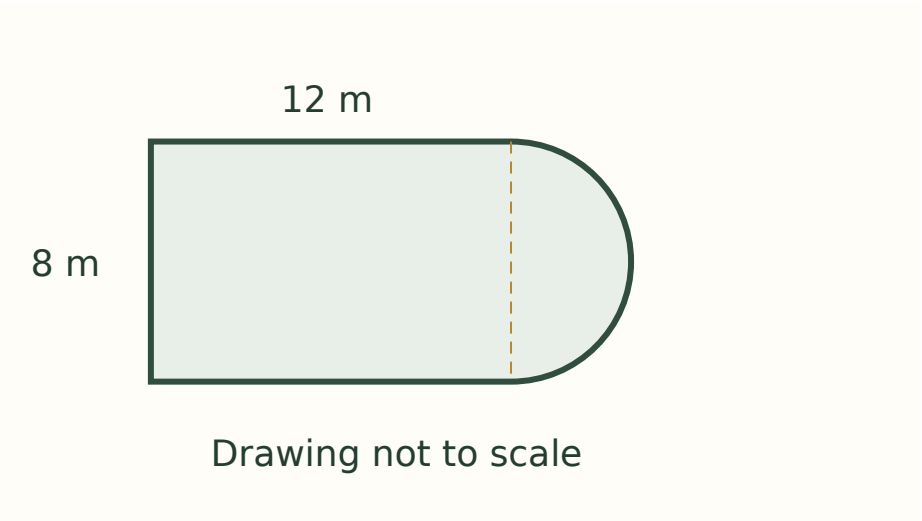
14. A student converts 4 cm² to 40 mm². Explain the mistake and give the correct conversion. [3 marks]

Since $1 \text{ cm} = 10 \text{ mm}$, 1 cm² is $10(10) = 100$ mm².

$4(100) = 400$ mm².

Answer: The length conversion was used only once. Correct result: 400 mm².

15. A play area consists of a 12 m by 8 m rectangle with a semicircle attached along one 8 m side. Use the diagram. [6 marks]



(a) Find the total area exactly. [3 marks]

Rectangle area: $12(8) = 96$ m².

Semicircle radius: 4 m. Its area is $\frac{1}{2}\pi(4)^2 = 8\pi$ m².

Add the areas.

Answer: $(96 + 8\pi)$ m².

(b) Find the outside perimeter exactly. [3 marks]

The three exposed rectangle edges total $12 + 8 + 12 = 32$ m.

The curved semicircle edge is $\pi(4) = 4\pi$ m.

The dashed join is internal and is not counted.

Answer: $(32 + 4\pi)$ m.