

# Topic Test: Measurement

Total time allowed: 45 minutes Total marks: 35

- 1 Write 367 000 in scientific notation:  
A  $36.7 \times 10^4$                       B  $0.367 \times 10^5$   
C  $3.67 \times 10^5$                         D  $3.67 \times 10^{-5}$
- 2 Convert 8.5 metres to millimetres.  
A 850 mm                              B 8500 mm  
C 85 mm                                D 0.085 mm
- 3 The radius of the Earth is approximately 6400 km.  
What is the circumference of the Earth at the equator?  
A 40 212 km                          B  $1.29 \times 10^8$  km  
C 20 106 km                          D 38 340 km
- 4 The mass of an orange was 250 g to the nearest 10 g.  
The percentage error in this measurement is:  
A  $\pm 4\%$                                 B  $\pm 2\%$   
C  $\pm 0.4\%$                               D  $\pm 0.2\%$
- 5 The longest side of a right-angled triangle is called the:  
A shortest side                        B middle side  
C hypotenuse                            D none of these
- 6 If two shorter sides of a right-angled triangle are 7 m and 8 m, then the hypotenuse is:  
A  $\sqrt{65}$  m                              B  $\sqrt{85}$  m  
C  $\sqrt{113}$  m                              D  $\sqrt{193}$  m
- 7 If the corresponding angles of two triangles are equal then the triangles are definitely:  
A congruent                              B similar  
C equilateral                              D isosceles
- 8 Evaluate  $12 \sin 85^\circ$ , correct to two decimal places.  
A 12.05                                  B 11.95  
C 1.05                                    D 137.16
- 9 A 3-metre ladder leans against a building with its top reaching a height of 2.6 metres. What angle does the ladder make with the wall, correct to the nearest degree?  
A  $35^\circ$                                       B  $40^\circ$   
C  $30^\circ$                                       D none of these

- 10 The diagonal of a rectangle makes an angle of  $42^\circ$  with one of the longer sides. If the width of the rectangle is 12 cm, find the length of the diagonal correct to one decimal place.

A 15.8 m                                  B 22.5 m  
C 10.5 m                                  D 17.9 m

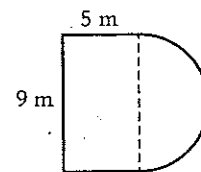
- 11 A flagpole and a building are on level ground, 95 metres apart. From the top of the flagpole the angle of depression to the top of the building is  $46^\circ$ . If the flagpole is 120 metres high, how high is the building? Give your answer correct to the nearest metre.

A 20 m                                      B 35 m  
C 26 m                                      D 22 m

- 12 How many square centimetres are in a square metre?

A 100                                        B 1000  
C 10 000                                    D 100 000

- 13 What is the perimeter of this figure to one decimal place?



A 33.1 cm                                  B 42.1 cm  
C 47.3 cm                                  D 76.8 cm

- 14 The number 0.010 6359 to two significant figures is:

A 0.01                                      B 0.010  
C 0.011                                    D 0.0106

- 15 A cube has a volume of  $3375 \text{ cm}^3$ . Find the length of each edge of the cube.

A 5 cm                                      B 15 cm  
C 25 cm                                    D 35 cm

**16** A swimming pool is in the shape of a rectangular prism, 10 metres long, 4 metres wide and 2.1 metres deep. Calculate the volume of water which the pool holds when full in:

a cubic metres

1 mark

b litres ( $1000 \text{ L} = 1 \text{ m}^3$ )

1 mark

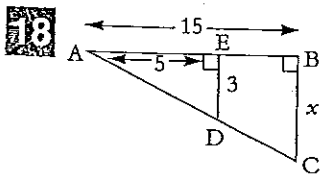
**17** A traffic roundabout consists of a central circular garden of diameter 12 metres, and two laneways for traffic, each  $3\frac{1}{2}$  metres wide, completely encircling the garden.

a Calculate the area of the garden.

1 mark

b The local council wishes to resurface the roundabout laneways. Calculate the area of roadway to be resurfaced.

2 marks



a Name a pair of similar triangles.

1 mark

b Find the value of  $x$ .

1 mark

c What is the scale factor of the large triangle to the smaller triangle?

1 mark

**19** Alexa walked across a block of land and made the following notes in her notebook (all measurements are in metres).

|    |    |    |
|----|----|----|
|    | A  |    |
|    | 0  | 15 |
|    | 9  |    |
| 14 | 11 | 15 |
|    | 23 |    |
|    | 37 |    |
|    | B  |    |

a Draw a sketch of the field diagram to correspond to these notes.

1 mark

b Calculate the perimeter of the block of land to one decimal place.

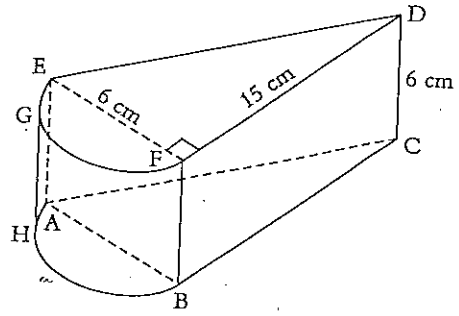
2 marks

c What is the cost of fencing the block of land if materials and labour cost a total of \$18 per metre?

1 mark

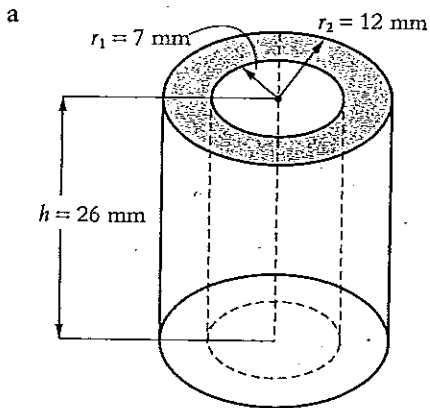
- d What is the cost of turfing the land if grass costs \$6.50 per square metre? 2 marks

b



2 marks

- 20 Calculate the volume of the following solids to one decimal place:



2 marks

- 21 In 1.5 hours 324 litres of water pours out of a pipe. Express the rate at which the water is flowing in mL/min. 1 mark

- 22 An estate is to be shared between three charities in a ratio of 2:3:5. If the estate is worth \$1.2 million, calculate the amount each charity receives. 1 mark

1  $367\,000 = 3.67 \times 10^5$  ✓

2  $8.5\text{ m} = 8.5 \times 1000\text{ mm}$   
 $= 8500\text{ mm}$  ✓

3  $C = 2\pi r$   
 $= 2 \times \pi \times 6400$   
 $= 40\,212\text{ km}$  ✓

4 Greatest possible error is  $0.5 \times$  smallest unit used  
 $= 0.5 \times 10\text{ g}$   
 $\frac{5\text{ g}}{250\text{ g}} \times 100 = 2\%$  ✓

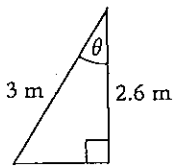
5 Hypotenuse ✓

6  $h^2 = 7^2 + 8^2$   
 $h^2 = 49 + 64$   
 $h^2 = 113$   
 $h = \sqrt{113}\text{ m}$  ✓

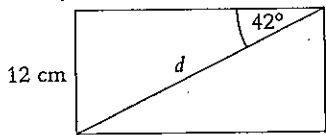
7 Similar ✓

8  $12 \sin 85^\circ = 11.954\,336\,38\dots$  [Cal.]  
 $= 11.95$  ✓

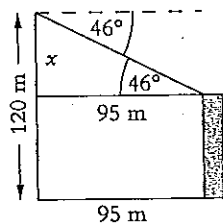
9  $\cos \theta = \frac{2.6}{3}$   
 $\cos \theta = 0.866\,666\dots$   
 $\theta = 29.926\dots$  [Cal.]  
 $\theta = 30^\circ$  [to nearest degree] ✓



10  $\sin 42^\circ = \frac{12}{d}$   
 $d \sin 42^\circ = 12$   
 $d = \frac{12}{\sin 42^\circ}$   
 $d = 17.933\,7186\dots$  [Cal.]  
 $d = 17.9\text{ cm}$  [1 d.p.] ✓



11  $\frac{x}{95} = \tan 46^\circ$   
 $x = 95 \tan 46^\circ$   
 $x = 98.375\,3798\dots$  [Cal.]  
 $h = 120 - 98.375\,3798\dots$   
 $h = 21.624\,6202\text{ m}$   
 $h = 22\text{ m}$  [to nearest metre] ✓



12  $1\text{ m}^2 = 10\,000\text{ cm}^2$  ✓

13 Perimeter = Distance around the outside  
 $P =$  Three straight sides + Circumference of half a circle  
 $P = 5 + 9 + 5 + \frac{1}{2} \times 2\pi \times 4.5$   
 $P = 33.137\,16\dots$  [from calculator]  
 $P = 33.1\text{ cm}$  [to 1 d.p.] ✓

14 Significant figures are counted left to right from the first non-zero digit, rounding where necessary. For example,  
 $0.010\,6359 = 0.011$ . ✓

15  $s^3 = V$   
 $s^3 = 3375$   
 $s = \sqrt[3]{3375}$   
 $s = 15\text{ cm}$

The side edges are 15 cm each. ✓

16 a  $V = l \times b \times h$   
 $= 10 \times 4 \times 2.1\text{ m}^3$   
 $= 84\text{ m}^3$  ✓

b  $1\text{ m}^3 = 1000\text{ L}$   
 $84\text{ m}^3 = 84 \times 1000\text{ L}$   
 $= 84\,000\text{ L}$  ✓

17 a  $A = \pi r^2$   
 $= \pi \times 6^2$   
 $= 113.097\,3355\dots$  [Cal.]  
 $= 113.1\text{ m}^2$  [1 d.p.] ✓

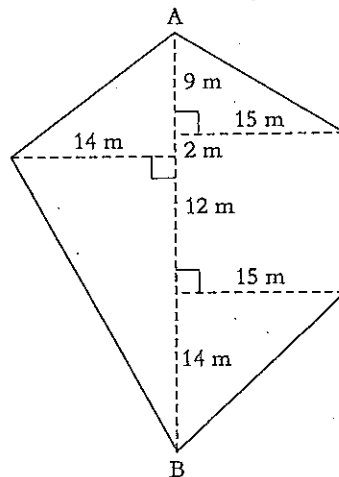
b Area of two laneways  $= \pi R^2 - \pi r^2$   
 $= \pi(13)^2 - \pi(6)^2$   
 $= 417.831\,8229\dots$  [Cal.]  
 $= 417.83\text{ m}^2$  [2 d.p.] ✓✓

18 a  $\triangle ABC$  and  $\triangle AED$  ✓

b  $\frac{x}{3} = \frac{15}{5}$   
 $x = \frac{15}{5} \times 3$   
 $x = 9$  ✓

c The scale factor of the large triangle to the smaller triangle is  $\frac{15}{5} = 3$ . ✓

19 a



b Using Pythagoras' Theorem:

$P = \sqrt{(9^2 + 15^2)} + 14 + \sqrt{(15^2 + 14^2)}$   
 $+ \sqrt{(26^2 + 14^2)} + \sqrt{(14^2 + 11^2)}$  ✓  
 $P = 99.345\,28\dots$  [from calculator]

$P = 99.3\text{ m}$  [to 1 d.p.] ✓

c Cost of fencing  $= 99.345\,28\dots \times \$18$   
 $= \$1788.20$  ✓

d Cost of turfing  
 $= \text{Area} \times \$6.50$   
 $= \left(\frac{1}{2} \times 37 \times 14 + \frac{1}{2} \times 15 \times [37 + 14]\right) \times \$6.50$  ✓  
 $= \$4169.75$  ✓

**20** a Volume =  $Ah$

$$= (\pi r_2)^2 - (\pi r_1)^2 \times h$$

$$= (\pi \times 12^2 - \pi \times 7^2) \times 26 \quad \checkmark$$

$$= 7759.733854... \text{ [Cal.]}$$

$$= 7759.7 \text{ mm}^3 \text{ [one decimal place]} \quad \checkmark$$

b Volume =  $Ah$

$$= \left(\frac{1}{2} \times \pi \times r^2 + \frac{1}{2} \times b \times h_1\right) \times h_2$$

$$= \left(\frac{1}{2} \times \pi \times 3^2 + \frac{1}{2} \times 15 \times 6\right) \times 6 \quad \checkmark$$

$$= 354.8230016... \text{ [Cal.]}$$

$$= 354.8 \text{ cm}^3 \text{ [one decimal place]} \quad \checkmark$$

**21**  $\frac{324 \text{ litres}}{1.5 \text{ hours}} = \frac{324000 \text{ mL}}{90 \text{ minutes}}$

$$= 3600 \text{ mL/min} \quad \checkmark$$

**22** \$1.2 million divided in the ratio 2:3:5 (10 parts)

$$= \frac{2}{10} \times 1200000; \frac{3}{10} \times 1200000; \frac{5}{10} \times 1200000$$

$$= \$240000; \$360000; \$600000 \quad \checkmark$$