

Geometry 3F Assessment

THE ANSWERS

Foundation Level



All questions apart from qu 13

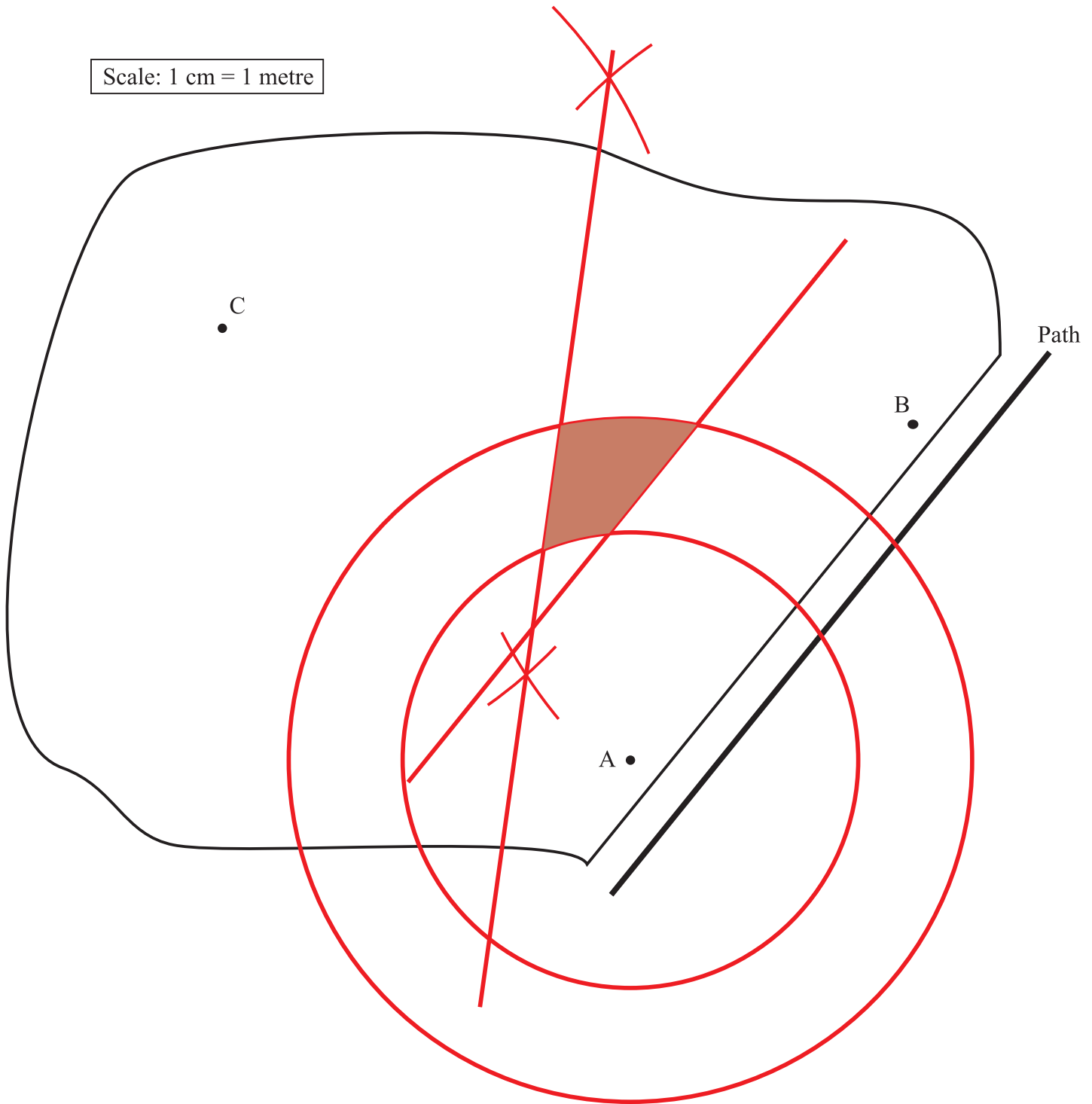
Clip	Grade	Title of clip	Question(s)	Marked out of	Score	%
165.....	5.....	Loci	1	5	—	—
166.....	5.....	Congruent Triangles	2 - 3	5	—	—
167.....	5.....	Sectors of a Circle	4	6	—	—
168.....	5.....	Trigonometry	5 - 7	23	—	—
169.....	5.....	Spheres.....	8	6	—	—
170.....	5.....	Pyramids	9	3	—	—
171.....	5.....	Cones	10 - 11	11	—	—
172.....	5.....	Frustums.....	12	5	—	—
173.....	5.....	Exact Trigonometric Values	13	3	—	—
174.....	5.....	Introduction to Vectors	14	6	—	—

Out of 73

TOTAL
SCORE _____

Final
Percentage %

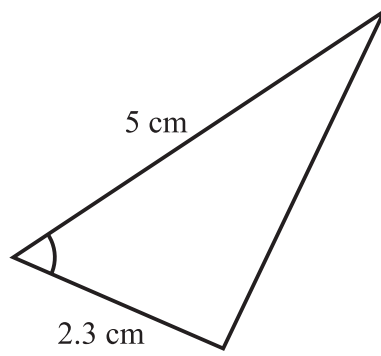
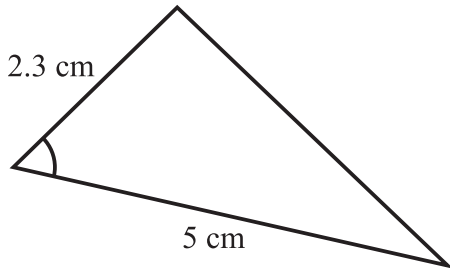
- 1) This is a picture of a garden with a path running alongside. Three posts are in the garden at A, B and C.



Treasure is buried in the garden so that it is:
 between 4 m and 6 m from A,
 closer to B than to C,
 more than 4 m from the path.

Using ruler and compasses only, shade the area of the garden where the treasure might be buried. **5**
 You **must** show all your construction arcs.

2) Put a cross in the box next to the rule which explains why these two triangles are congruent. 2



- RHS
- SAS
- ASA
- SSS
- None of the above because they are not congruent.

3) Prove that triangle ABC is congruent to triangle CDA. 3

Angle DAC = angle BCA (alternate angles)

Angle BAC = angle DCA (alternate angles)

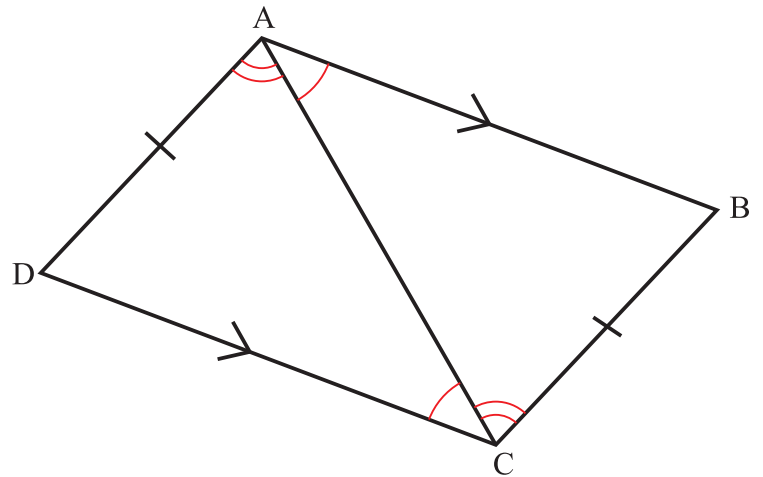
Angle ABC = 180 - angle BAC - angle BCA

Angle CDA = 180 - angle DCA - angle DAC

Hence angle ABC = angle CDA

AD = CB (given)

Triangle ABC is congruent to triangle CDA (ASA)



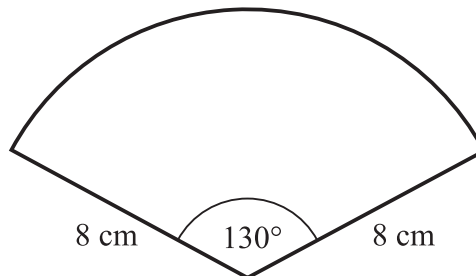
4) The diagram shows a sector of a circle.

- a) Find the area of the sector.
Give your answer to 1 decimal place.

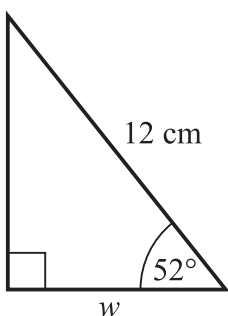
72.6 cm² 3

- b) Find the perimeter of the sector.
Give your answer to 1 decimal place.

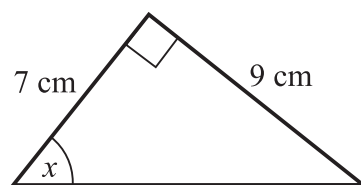
34.2 cm 3



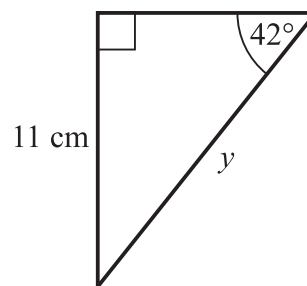
5) Find the lengths of the missing sides and angles.
Give your answers to 1 decimal place.



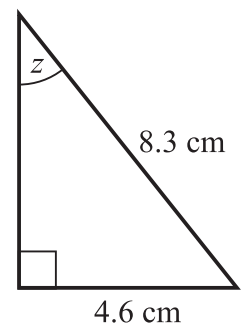
a) $w = \underline{7.4}$ cm 3



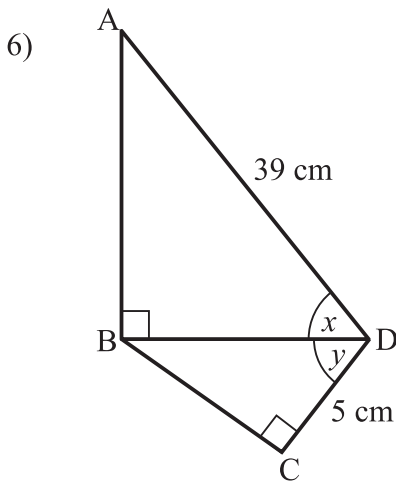
b) $x = \underline{52.1}$ ° 3



c) $y = \underline{16.4}$ cm 3



d) $z = \underline{33.7}$ ° 3



In the diagram, $\cos x = \frac{1}{3}$

Find the value of $\sin y$, showing all your working in the space, below. 6

$$\cos x = \frac{BD}{39} = \frac{1}{3}$$

$$BD = 13$$

Using Pythagoras in BCD, $13^2 = 5^2 + BC^2$

$$BC^2 = 169 - 25$$

$$= 144$$

$$BC = 12$$

$$\sin y = \frac{12}{13}$$

7) The diagram shows the net of a square-based pyramid.

The area of the square base is 25 cm^2 .

Work out the area of one triangular face. 5

You must show all your working.

Area of square base is 25

$$AB = 5$$

$$\tan 70 = \frac{CD}{AD}$$

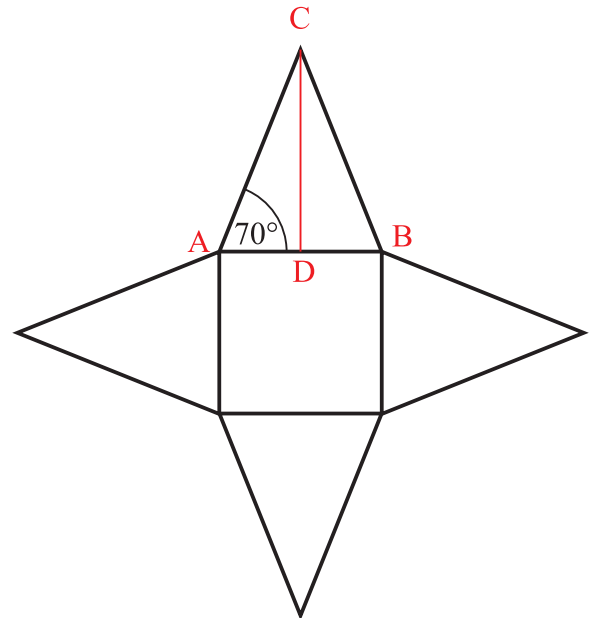
$$\tan 70 = \frac{CD}{2.5}$$

$$CD = 2.5 \times \tan 70$$

$$CD = 6.869$$

$$\text{Area} = 0.5 \times 5 \times 6.869$$

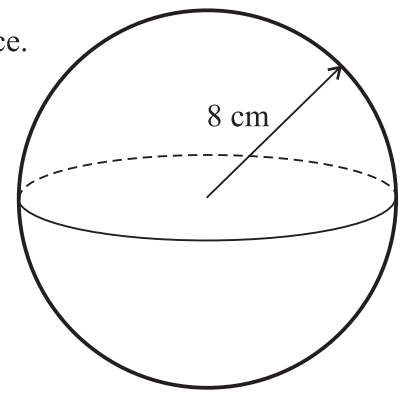
$$\text{Area of one triangular face} = 17.2 \text{ cm}^2$$



- 8) a) Work out the volume of the sphere, giving your answer to 1 decimal place.

$$\text{Volume} = \frac{4}{3} \pi r^3$$

$$\text{Surface area} = 4\pi r^2$$



Volume = 2144.7 cm³ 3

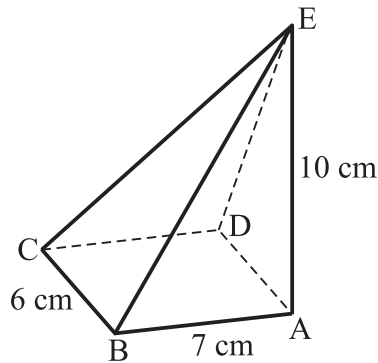
- b) Work out the surface area of the sphere, giving your answer to 1 decimal place.

Surface area = 804.2 cm² 3

- 9) The pyramid has a rectangular base and E is directly above A.

Find the volume of the pyramid.

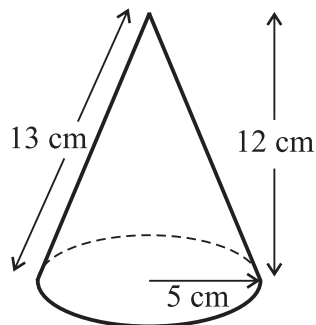
$$\text{Volume} = \frac{1}{3} \times \text{base area} \times \text{height}$$



Volume = 140 cm³ 3

- 10) For the cone, shown, find

- a) The volume.



$$\text{Volume} = \frac{1}{3} \pi r^2 h$$

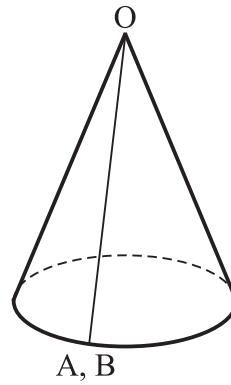
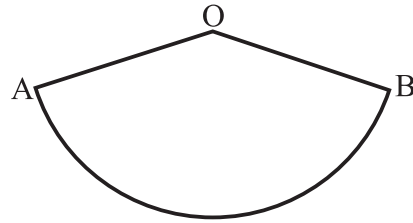
$$\text{Curved surface area} = \pi r l$$

Volume = 314.2 cm³ 3

- b) The **total** surface area.

Total surface area = 282.7 cm² 3

11) The sector AOB of a circle is shown.



$$\text{Volume} = \frac{1}{3} \pi r^2 h$$

The length of its arc is 16π cm.

The sector is folded so that the straight edges meet and form a cone.

a) Calculate the radius of the base of the cone.

Radius is 8 cm 2

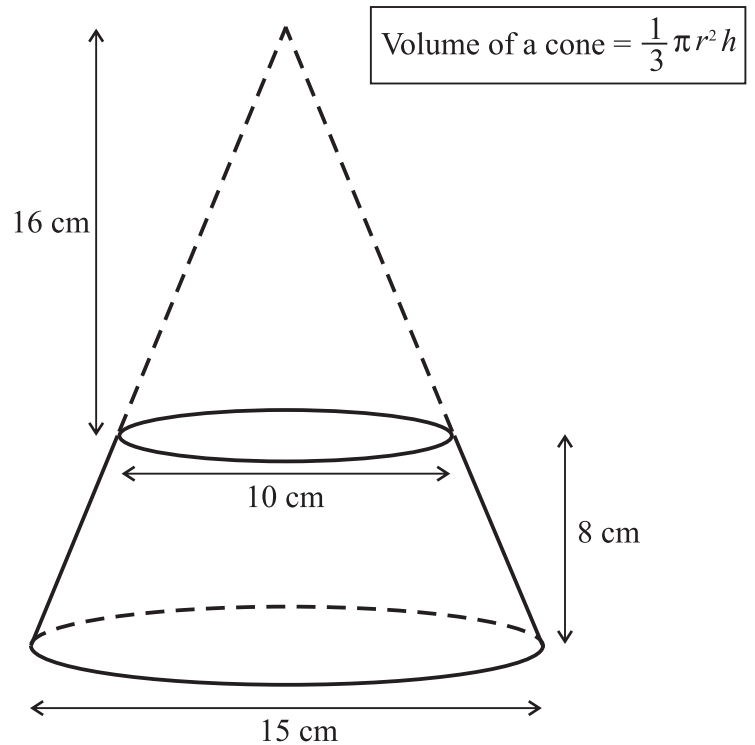
b) The volume of the cone is 1024π cm³.

Work out the perpendicular height of the cone.

Perpendicular height is 48 cm 3

12) The frustum, shown, is made by removing a small cone from a similar large cone.

Work out the volume of the frustum.
Give your answer to 1 decimal place.



Volume of the frustum = 994.8 cm³ 5

13) Write down the **exact** value of (do **not** use a calculator for this question):

a) $\cos 30^\circ = \underline{0.5}$ 1

b) $\sin 45^\circ = \underline{1}$ 1

c) $\tan 30^\circ = \underline{1}$ 1

14) Here are two column vectors $\mathbf{f} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$ $\mathbf{g} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$

Work out

a) $2\mathbf{g} = \begin{pmatrix} 8 \\ 2 \end{pmatrix}$ 2

b) $\mathbf{f} + \mathbf{g} = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$ 2

c) $3\mathbf{g} - \mathbf{f} = \begin{pmatrix} 14 \\ -2 \end{pmatrix}$ 2