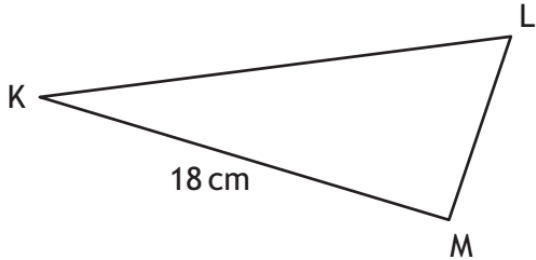# Sine Rule, Cosine rule, Area of Triangles

YEAR	PAPER	QUESTION
2014	1	In triangle KLM • KM = 18 centimetres • sin K = 0·4 • sin L = 0·9 Calculate the length of LM. **3**
2014	2	**10.** In a race, boats sail round three buoys represented by A, B, and C in the diagram below. B is 8 kilometres from A on a bearing of 060°. C is 11 kilometres from B. A is 13 kilometres from C. (a) Calculate the size of angle ABC.　**3** (b) Hence find the size of the shaded angle.　**2**
2015	2	Triangle ABC is shown below. Calculate the length of AB.　**3**

| 2015 | 2 | The top of a table is in the shape of a regular hexagon.

The three diagonals of the hexagon which are shown as dotted lines in the diagram below each have length 40 centimetres.
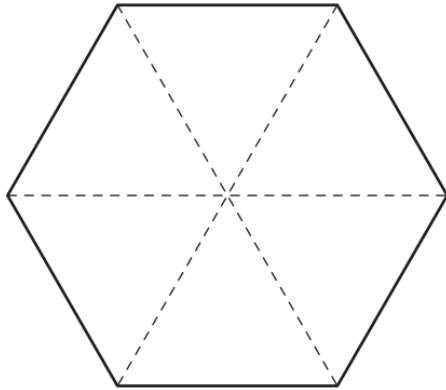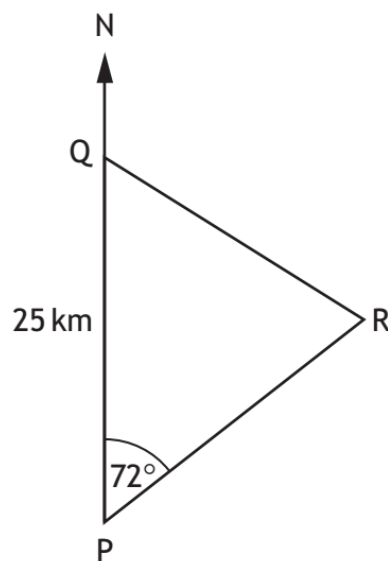

Calculate the area of the top of the table.   **4** |
|------|---|---|
| 2015 | 2 | In the diagram below P, Q and R represent the positions of Portlee, Queenstown and Rushton respectively.

Portlee is 25 kilometres due South of Queenstown.
From Portlee, the bearing of Rushton is 072°.
From Queenstown, the bearing of Rushton is 128°.

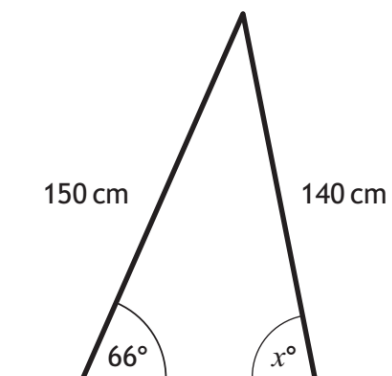Calculate the distance between Portlee and Rushton.

Do not use a scale drawing.   **4** |

2016	2	A set of stepladders has legs 150 centimetres and 140 centimetres long.

When the stepladder is fully open, the angle between the longer leg and the ground is 66°.

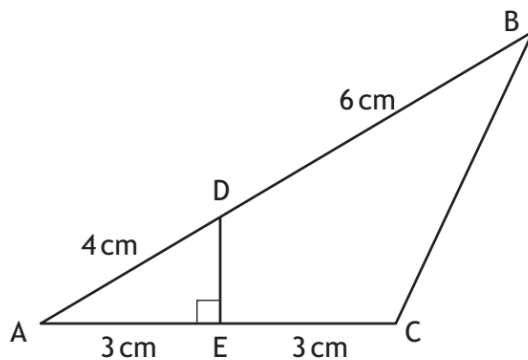Calculate $x°$, the size of the angle between the shorter leg and the ground.   **3**
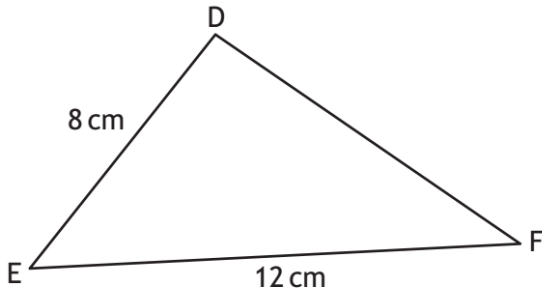
2016	2	

In the diagram below:

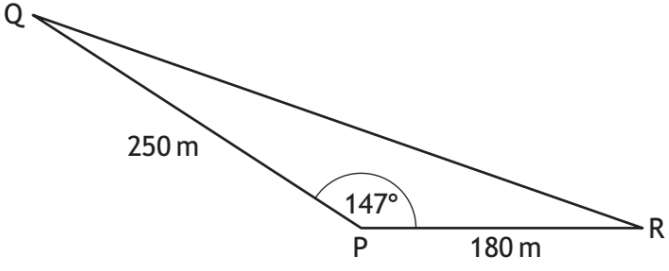- DE is perpendicular to AC.
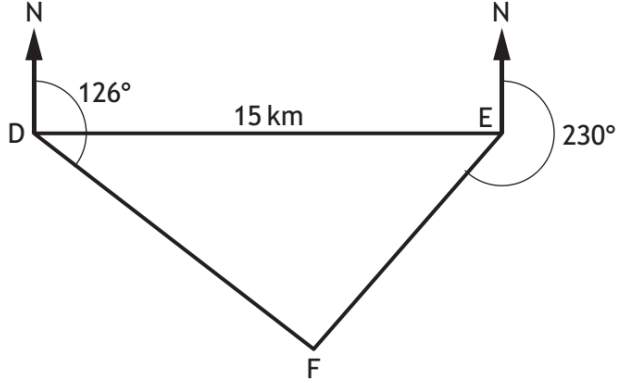- AD = 4 centimetres.
- DB = 6 centimetres.
- AE = EC = 3 centimetres.

Calculate the length of BC.
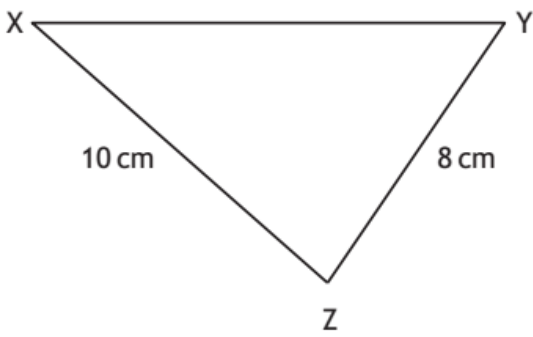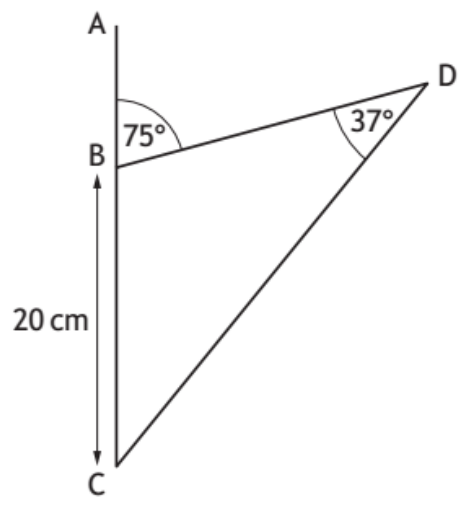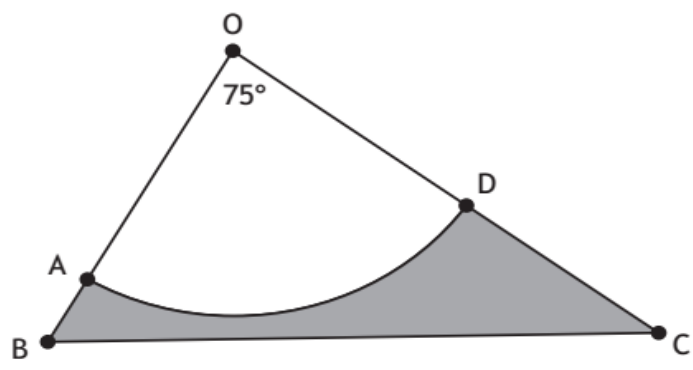
Give your answer correct to one decimal place.   **4**

| 2017	1	In triangle DEF: • DE = 8 centimetres • EF = 12 centimetres • $\sin E = \dfrac{2}{3}$ Calculate the area of triangle DEF. **2**
2017	2	A piece of land is in the shape of a triangle as shown. • PQ = 250 metres • PR = 180 metres • angle QPR = 147° The owner wishes to build a fence along the side QR. Calculate the length of the fence. **3**
2017	2	In the diagram below D, E and F represent the positions of Dunbridge, Earlsford and Fairtown respectively. Dunbridge is 15 kilometres west of Earlsford. From Dunbridge, the bearing of Fairtown is 126°. From Earlsford the bearing of Fairtown is 230°. Calculate the distance between Dunbridge and Fairtown. **4** **Do not use a scale drawing.**

2018	1	In triangle XYZ: • XZ = 10 centimetres • YZ = 8 centimetres • $\cos Z = \dfrac{1}{8}$. Calculate the length of XY.	**3**

2018	2	In this diagram: • angle ABD = 75° • angle BDC = 37° • BC = 20 centimetres. Calculate the length of DC.	**3**

2018	2	In the diagram below AOD is a sector of a circle, with centre O, and BOC is a triangle. In sector AOD: • radius = 30 centimetres • angle AOD = 75°. In triangle OBC: • OB = 38 centimetres • OC = 55 centimetres. Calculate the area of the shaded region, ABCD.	**5**

2019	2	The diagram shows triangle PQR.
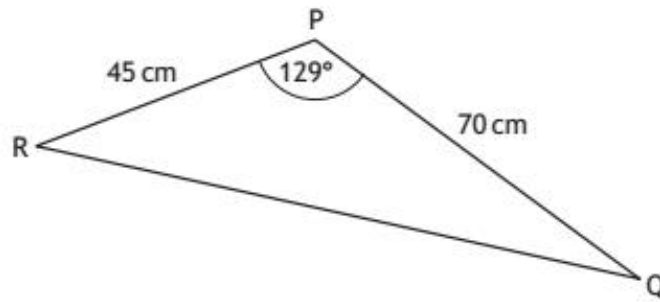
- PR = 45 centimetres
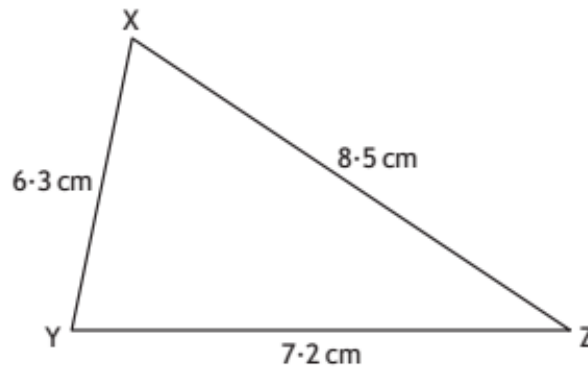- PQ = 70 centimetres
- Angle QPR = 129°

Calculate the area of triangle PQR.

2

2019	2	Triangle XYZ is shown below.

Calculate the size of the smallest angle in triangle XYZ.

3

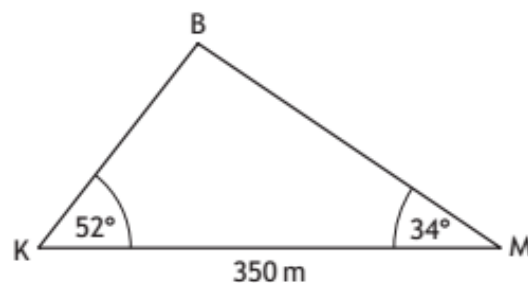| 2019	2	

Katy and Mona are looking up at a hot-air balloon.

In the diagram below, K, M and B represent the positions of Katy, Mona and the balloon respectively.

- The angle of elevation of the balloon from Katy is 52°
- The angle of elevation of the balloon from Mona is 34°
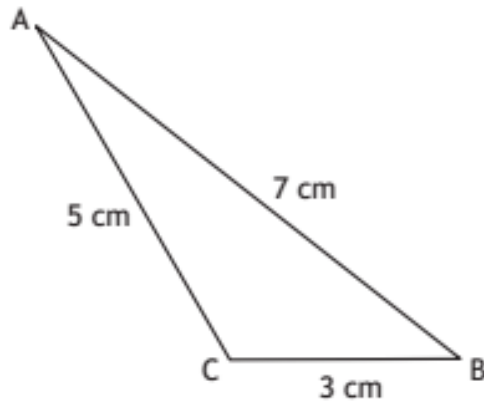- Katy and Mona are 350 metres apart on level ground

Calculate the height of the hot-air balloon above the ground.

5

2022	1	The diagram shows triangle ABC.

- AB = 7 centimetres
- BC = 3 centimetres
- AC = 5 centimetres

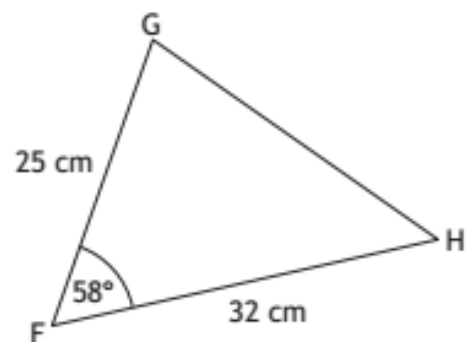Calculate the value of cosB.

Give your answer in its simplest form.   **2**
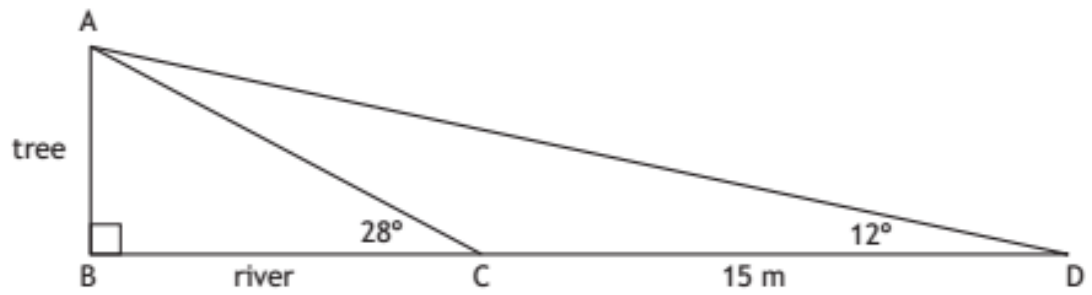
2022	2	The diagram shows triangle FGH.

- FG = 25 centimetres
- FH = 32 centimetres
- Angle GFH = 58°

Calculate the area of triangle FGH.   **2**

| 2022 | 2 | The width of a river is represented by BC in the diagram below. |
| | | AB represents a tree on the river bank. |

- From C, the angle of elevation to A is 28°.
- From D, the angle of elevation to A is 12°.
- The distance from C to D is 15 metres.
- BCD is a straight line.

Calculate BC, the width of the river. **5**