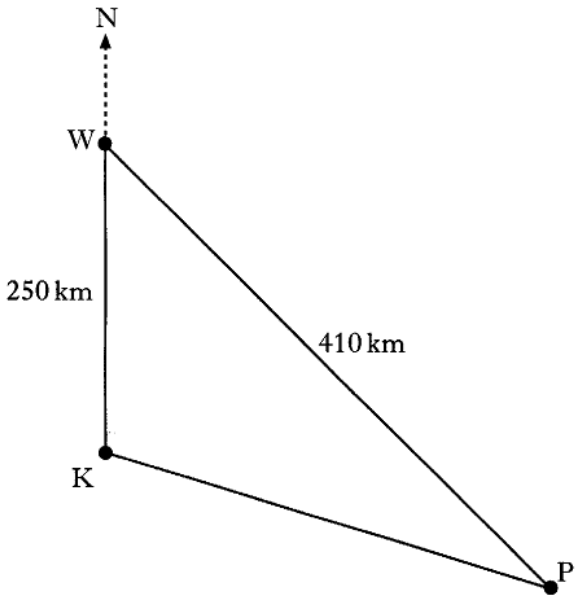
Triangles fall into many categories. Sine Rule, Cosine Rule, Area formula, Bearings, Similarity, SoHCaHToA, Pythagoras Theorem amongst others.

You are not told which technique is appropriate for each question. There may be questions that involve more than one strategy.

If using a formula, write the formula and then Substitute.

Marks are only available for rounding if you show the unrounded number first.

**6.** Three radio masts, Kangaroo (K), Wallaby (W) and Possum (P) are situated in the Australian outback.




**Kangaroo is 250 kilometres due south of Wallaby.**

**Wallaby is 410 kilometres from Possum.**

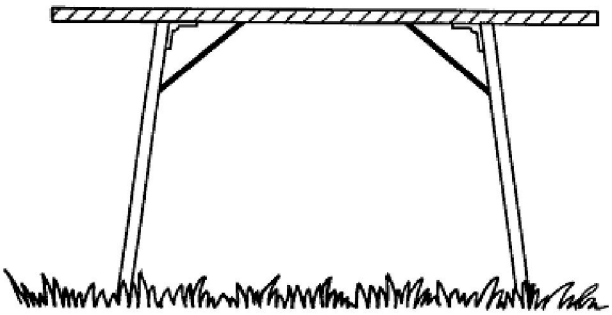
**Possum is on a bearing of 130° from Kangaroo.**

Calculate **the bearing of Possum from Wallaby.**

**Do not use a scale drawing.**

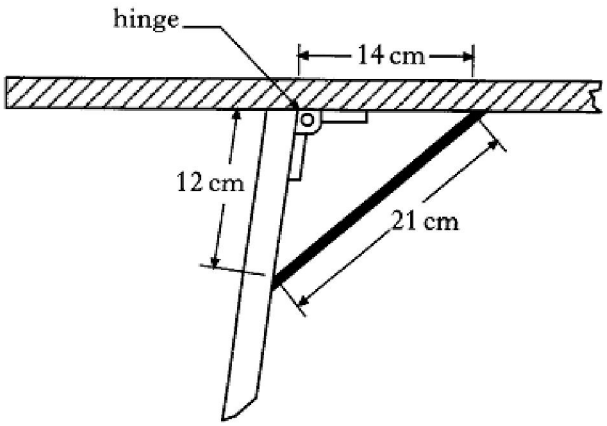
**4**

**10.** Each leg of a folding table is prevented from opening too far by a metal bar.



The metal bar is 21 centimetres long.

It is fixed to the table **top** 14 centimetres from the hinge and to the table **leg** 12 centimetres from the hinge.

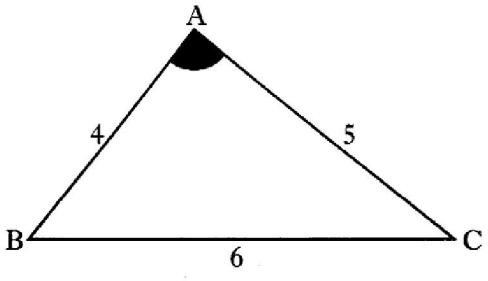



(*a*) Calculate the size of the obtuse angle which the table top makes with the leg. **3**

(*b*) Given that the table leg is 70 centimetres long, calculate the height of the table. **3**

**7.** In triangle ABC,

AB = 4 units
AC = 5 units
BC = 6 units.




Show that $\cos A = \frac{1}{8}$. **3**

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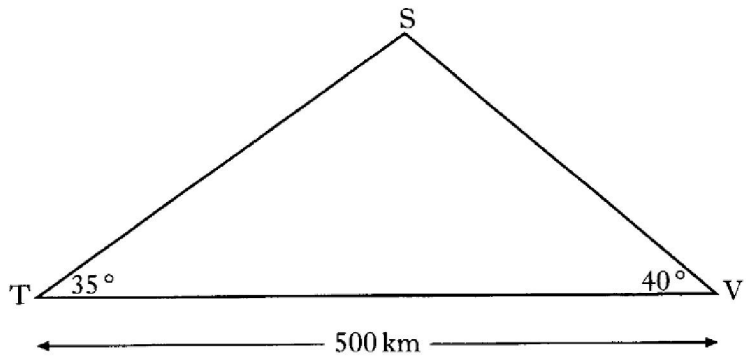
**4.** A TV signal is sent from a transmitter T, via a satellite S, to a village V, as shown in the diagram. The village is 500 kilometres from the transmitter.

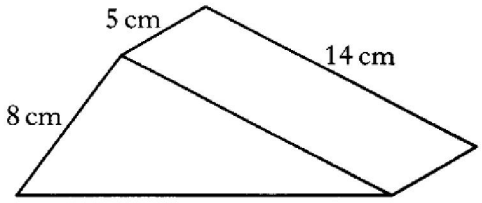



The signal is sent out at an angle of 35° and is received in the village at an angle of 40°.

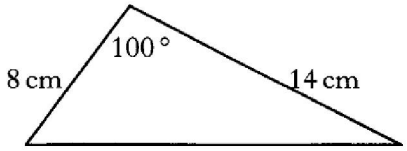
Calculate the height of the satellite above the ground.

**5**

**8.** A metal door-stop is prism shaped, as shown.



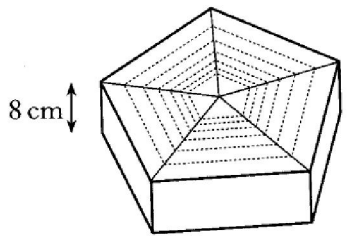

The uniform cross-section is shown below.

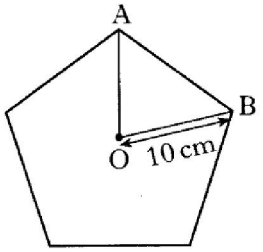



Find the volume of metal required to make the door-stop.

**4**

**9.** A gift box, 8 centimetres high, is prism shaped.



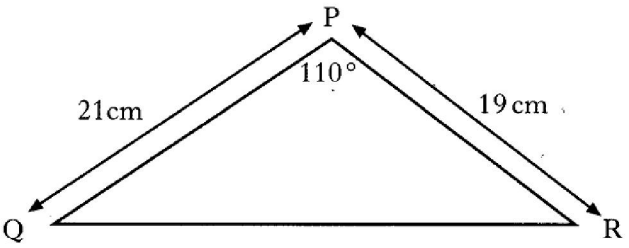

The uniform cross-section is a regular pentagon.

Each vertex of the pentagon is 10 centimetres from the centre O.

Calculate the volume of the box.

**5**

**3.**

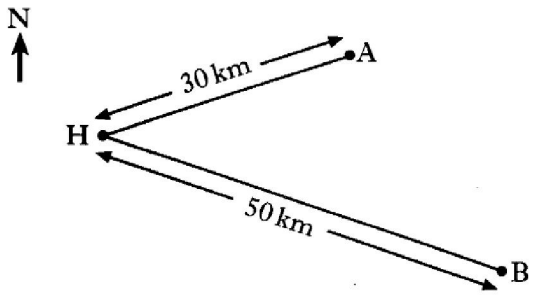



Calculate the area of triangle PQR. **4**

**3.** Two yachts leave from harbour H.

Yacht A sails on a bearing of 072° for 30 kilometres and stops.

Yacht B sails on a bearing of 140° for 50 kilometres and stops.




How far apart are the two yachts when they have both stopped?

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

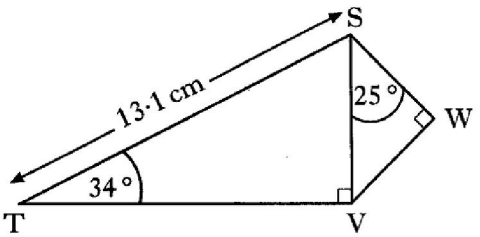
**6.** In the diagram,

Angle STV = 34°

Angle VSW = 25°

Angle SVT = Angle SWV = 90°

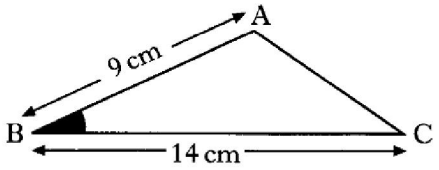
ST = 13·1 centimetres.




Calculate the length of SW. **4**

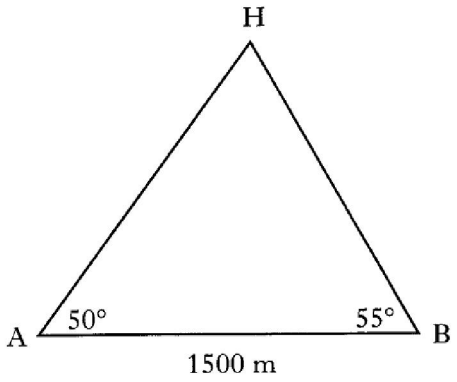
**7.** The area of triangle ABC is 38 square centimetres.

AB is 9 centimetres and BC is 14 centimetres.




Calculate the size of the acute angle ABC. **3**

**5.** A helicopter, at point H, hovers between two aircraft carriers at points A and B which are 1500 metres apart.



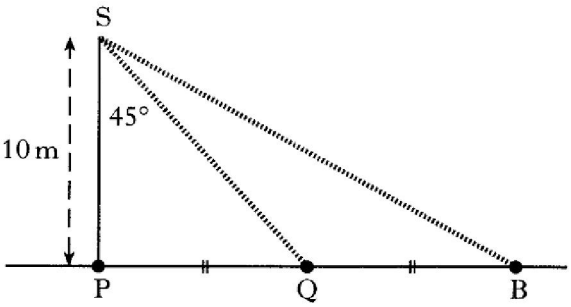

From carrier A, the angle of elevation of the helicopter is 50°.

From carrier B, the angle of elevation of the helicopter is 55°.

Calculate the distance from the helicopter to the nearer carrier. **4**

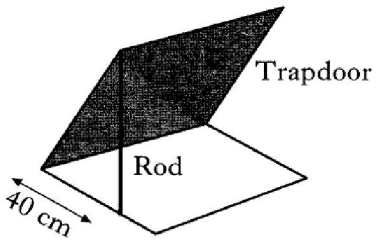
**6.** The diagram below shows a spotlight at point S, mounted 10 metres directly above a point P at the front edge of a stage.

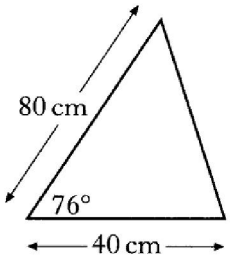
The spotlight swings 45° from the vertical to illuminate another point Q, also at the front edge of the stage.




Through how many **more** degrees must the spotlight swing to illuminate a point B, where Q is the mid-point of PB? **5**

**7.** A square trapdoor of side 80 centimetres is held open by a rod as shown.



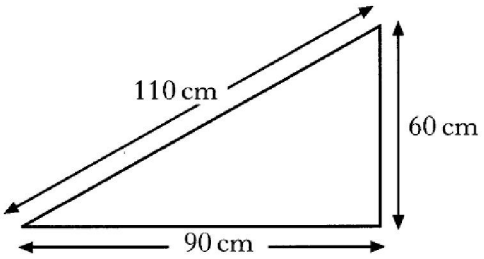




The rod is attached to a corner of the trapdoor and placed 40 centimetres along the edge of the opening.

The angle between the trapdoor and the opening is 76°.

Calculate the length of the rod to **2 significant figures**. **4**

**5.** A triangular paving slab has measurements as shown.



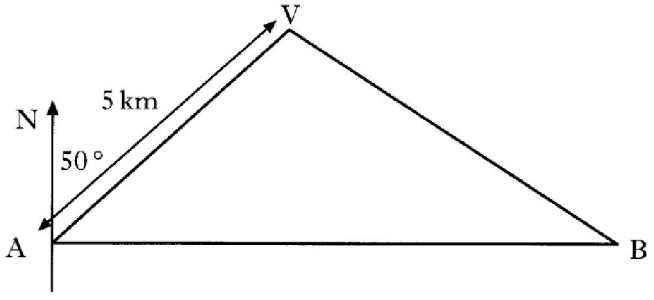

Is the slab in the shape of a right angled triangle?

**Show your working.** **3**

**7.** David walks on a bearing of 050° from hostel A to a viewpoint V, 5 kilometres away.

Hostel B is due east of hostel A.

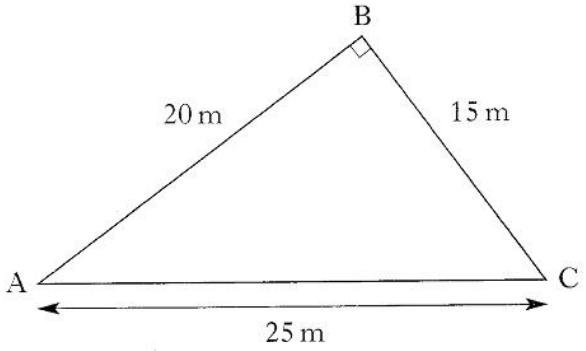
Susie walks on a bearing of 294° from hostel B to the same viewpoint.




Calculate the length of AB, the distance between the two hostels. **5**

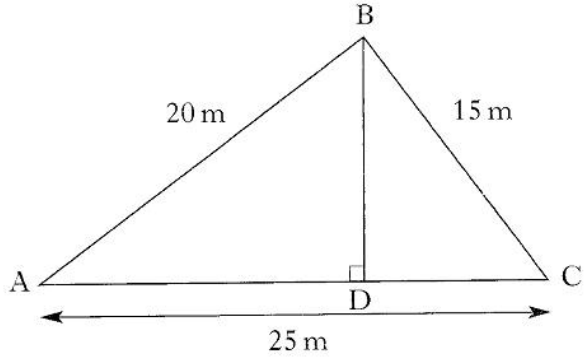
**10.** Triangle ABC is right-angled at B.

The dimensions are as shown.




(*a*) Calculate the area of triangle ABC. **1**

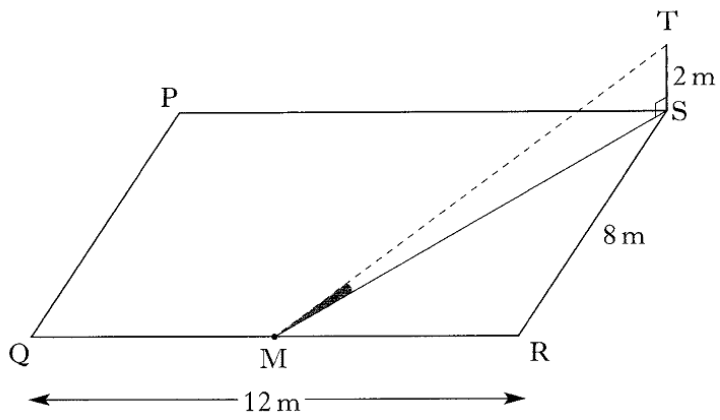
(*b*) BD, the height of triangle ABC, is drawn as shown.




Use your answer to part (*a*) to calculate the height BD.

**5.** ST, a vertical pole 2 metres high, is situated at the corner of a rectangular garden, PQRS.

RS is 8 metres long and QR is 12 metres long.

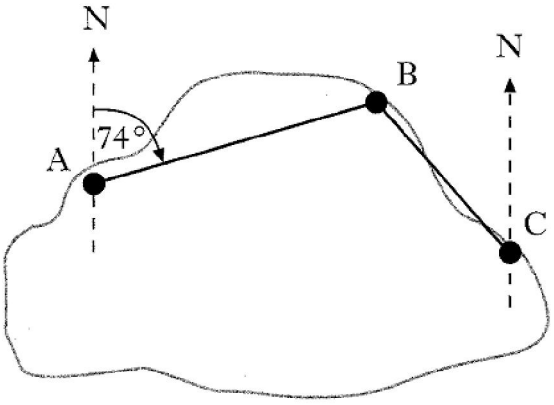



The pole casts a shadow over the garden.

The shadow reaches M, the midpoint of QR.

Calculate the size of the shaded angle TMS. **4**

**6.** (*a*) There are three mooring points A, B and C on Lake Sorling.




From A, the bearing of B is 074 °.

From C, the bearing of B is 310 °.

Calculate the size of angle ABC.

(*b*) B is 230 metres from A and 110 metres from C.

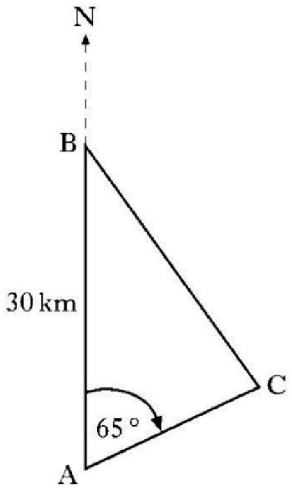
Calculate the direct distance from A to C.

Give your answer **to 3 significant figures**.

**6.** Brunton is 30 kilometres due North of Appleton.

From Appleton, the bearing of Carlton is 065 °.

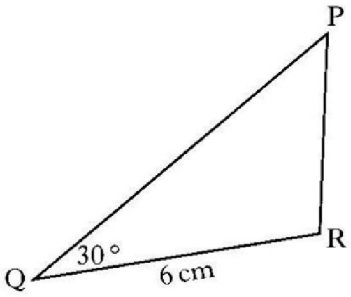
From Brunton, the bearing of Carlton is 153 °.




Calculate the distance between Brunton and Carlton. **4**

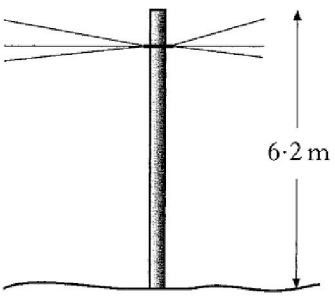
**8.** In triangle PQR:

- QR = 6 centimetres
- angle PQR = 30 °
- area of triangle PQR = 15 square centimetres.

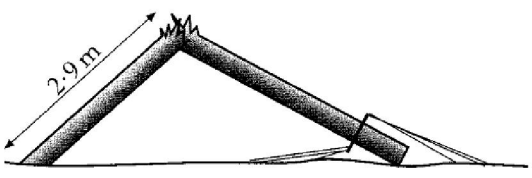


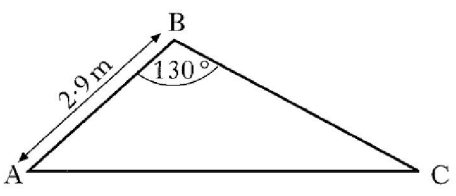

Calculate the length of PQ. **3**

**7.** A telegraph pole is 6·2 metres high.




The wind blows the pole over into the position as shown below.

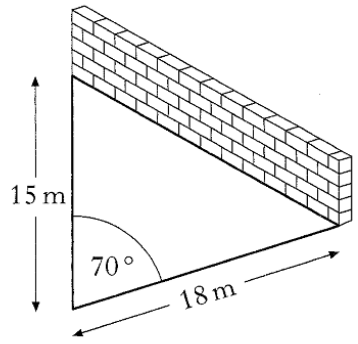



AB is 2·9 metres and angle ABC is 130 °.

Calculate the length of AC. **4**

**8.** A farmer builds a sheep-pen using two lengths of fencing and a wall.




The two lengths of fencing are 15 metres and 18 metres long.

(*a*) Calculate the area of the sheep-pen, when the angle between the fencing is 70°. **3**

(*b*) What angle between the fencing would give the farmer the largest possible area? **1**