

9. Trigonometry – Non-right angled triangles

Using sine rule, cosine rule, area of triangle 1

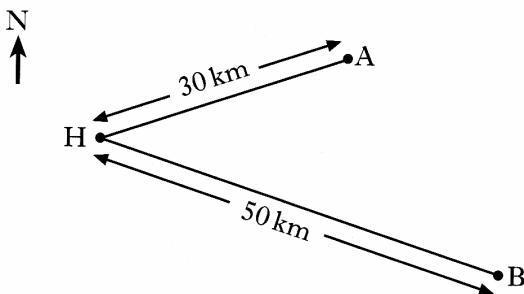
1. Two yachts leave from harbour H.

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?

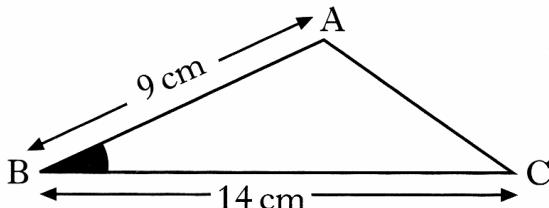
Do not use a scale drawing.



4 RE

2. The area of triangle is 38 square centimeters.

AB is 9 centimetres and BC is 14 centimetres.



Calculate the size of the acute angle ABC

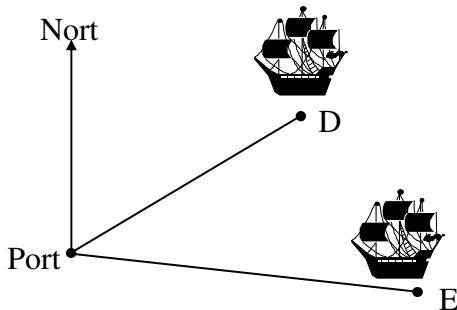
3 RE

3. Two boats leave port together.

Boat D sails on a course of 057° at 13 miles per hour.

Boat E sails on a bearing of 104° at 15 miles per hour.

After 45 minutes Boat D receives a distress call from Boat E requesting their help as soon as possible.

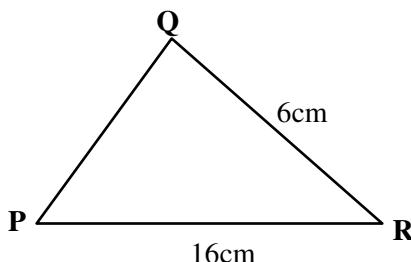


How far, to the nearest mile, would Boat D have to travel to reach Boat E?

4 RE

4. The area of the triangle shown is 36 cm^2 .

Show that $\sin R = \frac{3}{4}$.

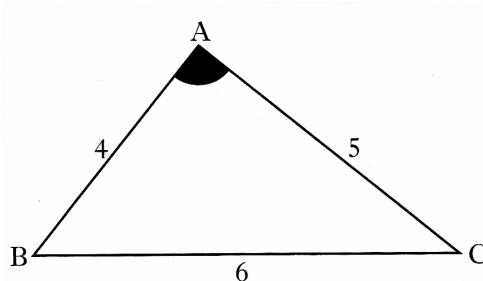


4 RE

5. In triangle ABC

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

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



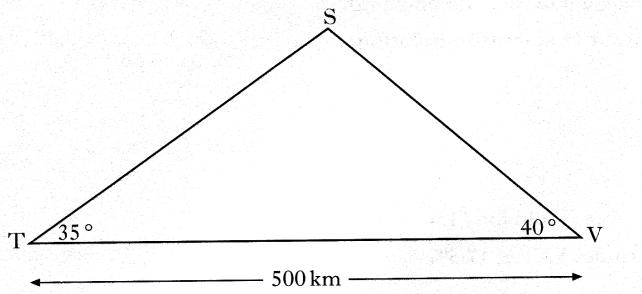
3 KU

6. 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° .

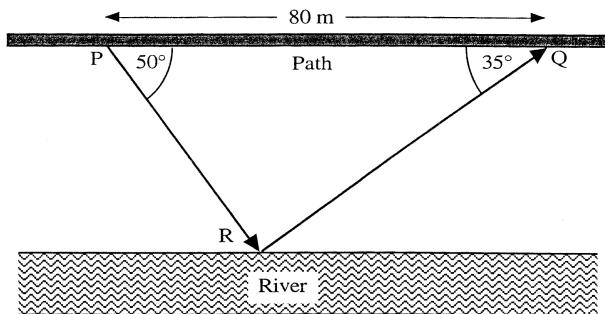
Calculate the height of the satellite above the ground.



5 RE

7. The path in the diagram opposite runs parallel to the river.

Jennifer leaves the path at P, walks to the river to bathe her feet at R and rejoins the path further on at Q.



Calculate the distance between the river and the path.

5 RE

8. The radio masts, Kangaroo (K), Wallaby (W) and Possum (P) are situated in the Australian outback.

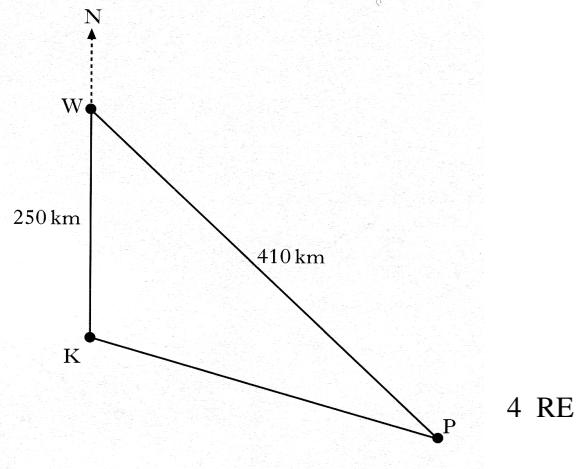
Kangaroo is 250 kilometres due south of Wallaby.

Wallaby is 410 kilometres from Possum

Possum is on a bearing of 130° from Kangaroo.

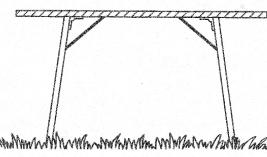
Calculate the bearing of Possum from Wallaby.

Do not use a scale drawing.



4 RE

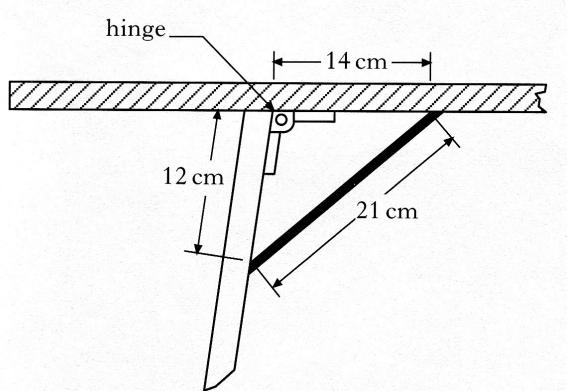
9. Each leg of a folding table is prevented from opening too far by a metal bar.



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.

- Calculate the size of the obtuse angle which the table top makes with the leg.
- Given that the table leg is 70 centimetres long, calculate the height of the table.



3 KU

3 RE

10. A newspaper group advertises a new magazine on a helium balloon.

From the base of the balloon, B, two holding wires are attached to the ground at A and C.

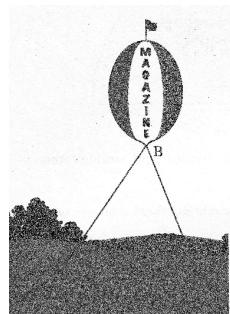
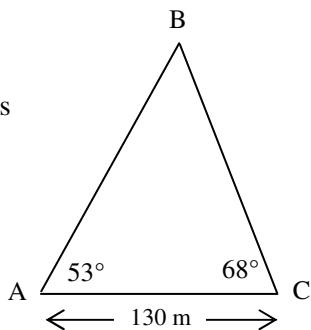
The distance from A to C is 130 metres.

From A, the angle of elevation of B is 53° .

From C, the angle of elevation of B is 68° .

Calculate the height of point B above the ground.

Do not use a scale drawing



5 RE

11. The bonnet of a car is held open, at an angle of 57° , by a metal rod.

In the diagram,

PQ represents the bonnet

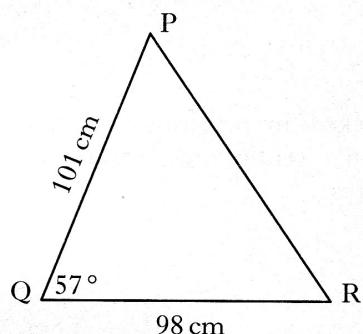
PR represents the metal rod.

QR represents the distance from the base of the bonnet to the front of the car.

PQ is 101 centimetres

QR is 98 centimetres

Calculate the length of the metal rod, PR.



Do not use a scale drawing.

4 KU

12. Triangle ABC has an area of 14 square centimetres.

AB is 6 centimetres and AC is 7 centimetres.

Calculate the possible **sizes** of angle BAC

4 RE

13. An orienteering course has 3 checkpoints – A, B and C.

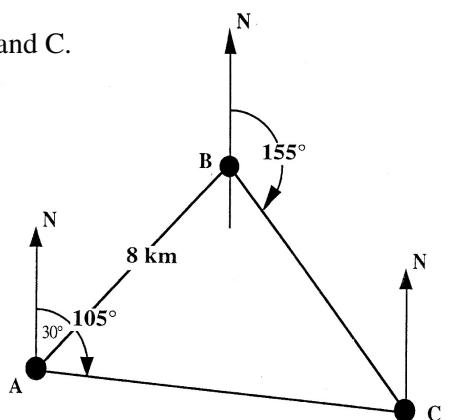
B is on a bearing of 030° and a distance of 8 km from A.

C is on a bearing of 155° from B and a bearing of 105° from A.

a) Explain clearly why $\angle ABC = 55^\circ$

b) Calculate the distance between points B and C.

Do not use a scale drawing.

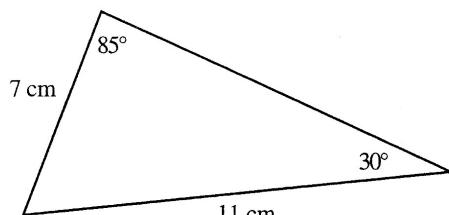


2 KU

4 RE

14. Calculate the area of the triangle.

3 RE



15. A rescue boat, at R, picks up a distress call from a boat B, 350 km away, on a bearing of 120° .

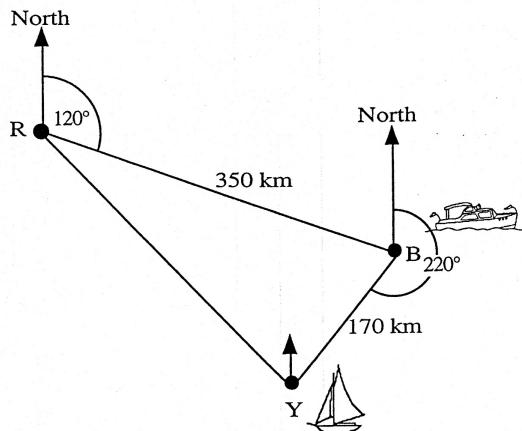
At the same time another distress call comes from a yacht Y, which is 170 km away from B and on a bearing of 220° from B.

- Prove that $\angle RBY = 80^\circ$
- The rescue boat is obliged to respond to the nearest distress call first.

Will the people on the boat or those on the yacht be rescued first ?

(You must support your answer by showing working).

2 KU



4 RE

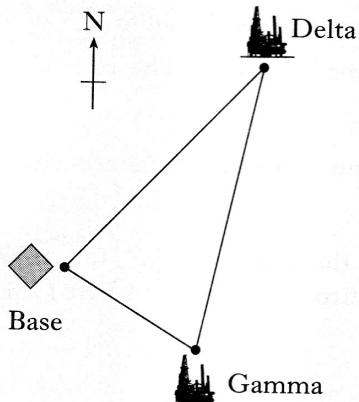
16. The diagram shows the position of a helicopter base and two oil rigs, Delta and Gamma.

From the helicopter base, the oil rig Delta is 35 kilometres away on a bearing of 050° .

From the same base, the oil rig Gamma is 20 kilometres away on a bearing of 125° .

Calculate the distance between Delta and Gamma.

Do not use a scale drawing.



5 RE

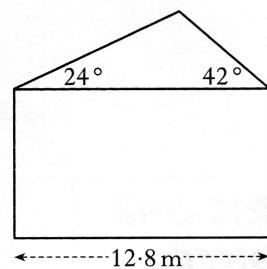
17. The end wall of a bungalow is in the shape of a rectangle and a triangle as shown in the diagram.

The roof has one edge inclined at an angle of 24° to the horizontal and the other edge inclined at 42° to the horizontal.

The width of the house is 12.8 metres.

Calculate the length of the longer sloping edge of the roof.

Do not use a scale drawing.



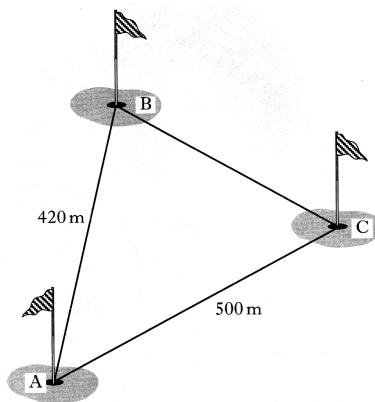
4 KU

18. The diagram shows part of a golf course.

The distance AB is 420 metres, the distance AC is 500 metres and angle BAC = 52° .

Calculate the distance BC.

Do not use a scale drawing.



3 KU