

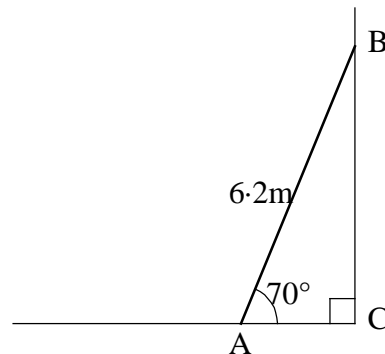
Topical Test Paper H9 : Trigonometry

Diagrams are NOT drawn to scale

1. A ladder, which has a length of 6.2 metres, is placed at an angle of 70° to level ground, to lean against a vertical wall.

Calculate

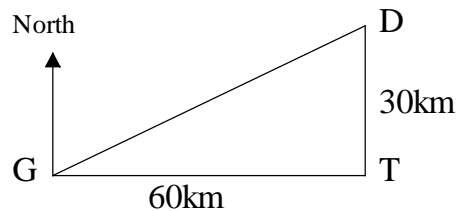
- (a) BC, the height of the wall at the point to which the ladder reaches.
 (b) AC, the horizontal distance between the foot of the ladder and the base of the wall.



2. Tonbridge is 30 kilometres due south of Dartford and 60 km due east of Guildford

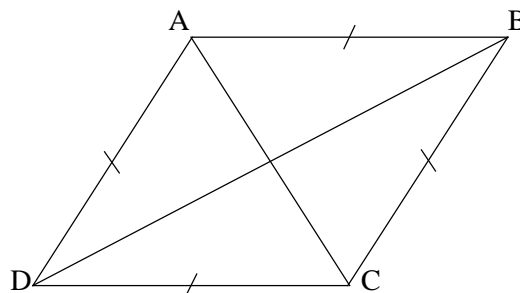
Calculate

- (a) the direct distance between Guildford and Dartford
 (b) the bearing of Dartford from Guildford



3. The diagonals of a rhombus always cross at an angle of 90°
 In the rhombus shown $AC=7\text{cm}$ and $BD=9\text{cm}$.

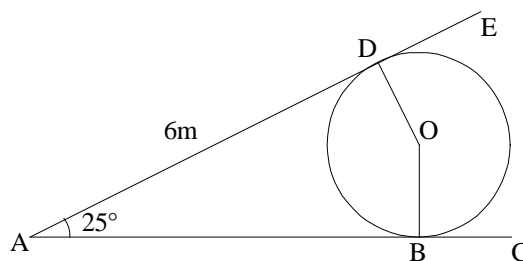
- (a) Calculate angle DAB
 (b) Calculate angle ABC



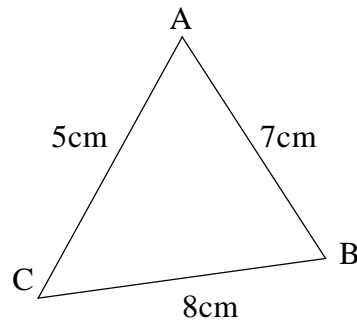
4. The diagram shows part of a steel framework, which has a circle, centre O with tangents AE and AC

The distance $AD=6\text{m}$ and angle $DAB=25^\circ$

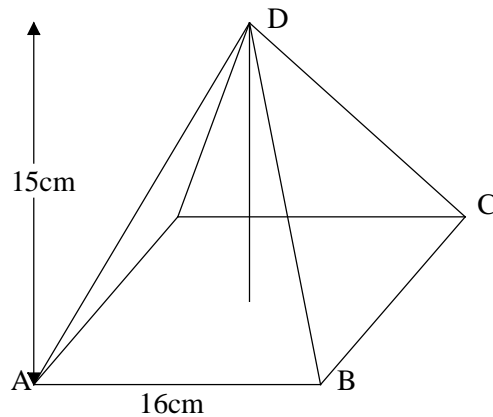
- (a) Write down the length of AB.
 (b) Write down the size of angle ABO
 (c) Calculate the radius of the circle correct to 2 decimal places.



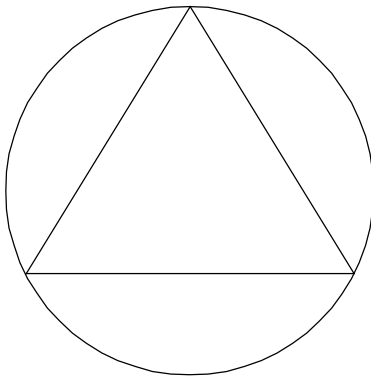
5. In the triangle ABC, $AB=7\text{cm}$, $BC=8\text{cm}$ and $CA=5\text{cm}$. Calculate the sizes of the angles A, B and C in the triangle.



6. A box is made in the shape of a square based pyramid. The square has sides 16cm long and the apex of the pyramid is 15cm vertically above the centre of the base.
- (a) Calculate the length of AC, the diagonal of the base.
- (b) Calculate angle DAC, the angle between the sloping edge and the base of the pyramid.



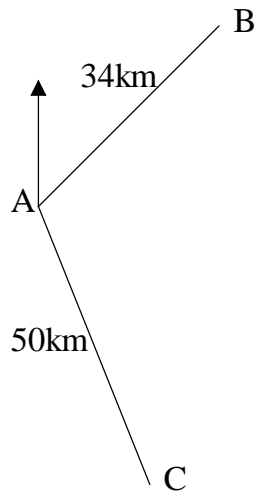
7.



A circular window has four panes of glass. The middle pane is an equilateral triangle of side 30cm, as shown in the diagram.

- (a) Calculate the area of the triangle
- (b) Work out the radius of the circle
- (c) Work out area of the circle.

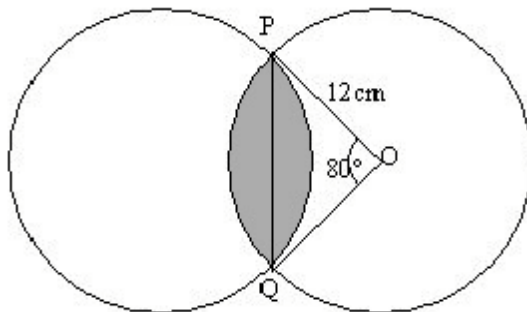
8.



Aircraft B is 34km from airfield A on a bearing of 050° from A. Aircraft C is 50 km from A on a bearing of 164° from A.

- Calculate the distance between the two aircraft giving your answer to the nearest kilometre.
- Find the bearing, to the nearest degree, of B from C.

9.

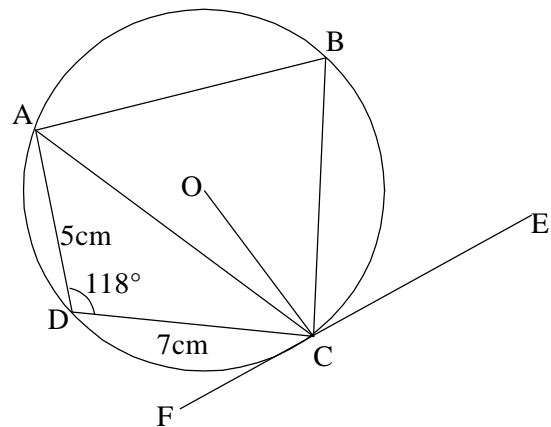


Two triangles, each of radius 12cm, overlap as shown in the diagram. A triangle is formed by the common chord PQ and radii OP and OQ of the circle with centre O. Angle $POQ=80^\circ$

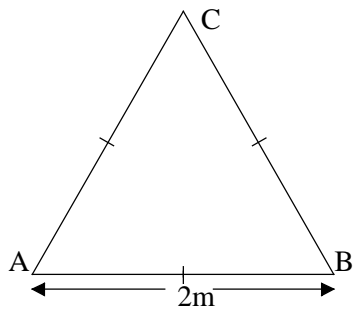
Calculate the area of the overlap, shown shaded in the diagram.

10. The circle shown has centre O and a tangent EF which touches the circle at C. The cyclic quadrilateral ABCD inside the circle has angle $D=118^\circ$

- Calculate angle OCA
- Given that $AD=5\text{cm}$ and $DC=7\text{cm}$ calculate the length of AC.
- Calculate the radius of the circle.
- Calculate angle FCD.



11.



ABC is an equilateral triangle of side 2m.

Without using a calculator:-

- (a) Find $\cos 60^\circ$
- (b) Show that $\tan 60^\circ = \frac{\sqrt{3}}{2}$

12. ABC is a non-right angled triangle. $AB = 5\text{cm}$, $AC = x\text{ cm}$, $BC = 2x\text{ cm}$, angle $BAC = 60^\circ$.

(a) Show that $3x^2 + 5x - 25 = 0$

(b) Work out the length of AC to 2 decimal places.

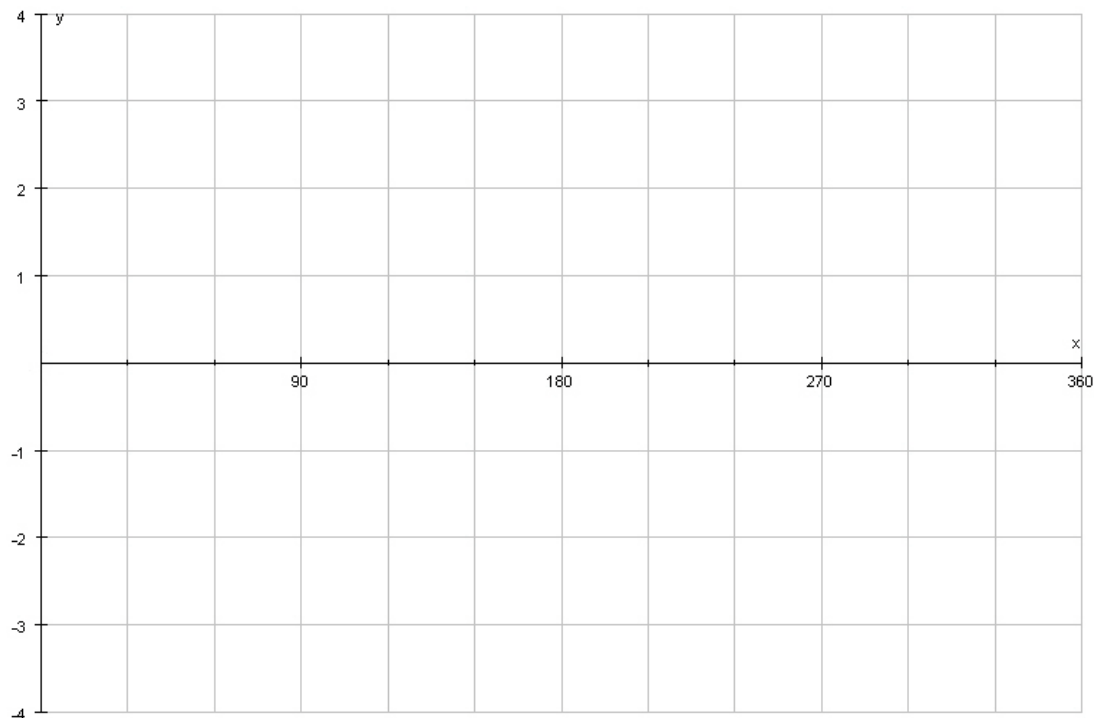
D is the point outside the triangle such that angle $ADB = 104^\circ$ and angle $DBA = 52^\circ$

(b) Work out the length of BD to 2 decimal places

13. Find the value of x such that $90 < x < 180$ and $\sin x^\circ = 0.5446$

14. (a) On the axis below sketch
- (i) the graph of $y = \sin x$
 - (ii) the graph of $y = \sin 3x$

Label each graph clearly



(b) Using your graph, or otherwise find x when (i) $\sin 3x = 0.5$

(ii) $\sin x = \sin 3x$

H9 : Trigonometry

1. (a) 5.8m (b) 2.1m
2. (a) 67km (b) 063°
3. (a) 104.3° (b) 75.7°
4. (a) 6m (b) 90° (c) 1.30m
5. A=81.8° B=38.2° C=60°
6. (a) 22.6cm (b) 41.0°
7. (a) 389.7cm² (b) 17.3cm
(c) 942.5cm²
8. (a) 71km (b) 010°
9. 59.2cm²

10. (a) Using the cosine rule:-

$$(2x)^2 = x^2 + 5^2 - 2 \times 5 \times x \times \cos 60$$

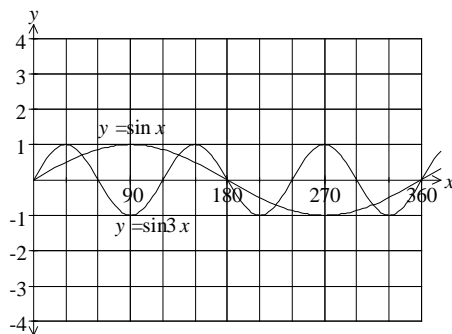
$$4x^2 = x^2 + 25 - 10x \times 0.5$$

$$3x^2 + 5x - 25 = 0$$

(b) 2.17cm (c) 2.10cm

11. 147°

12.



(b)(i) 10°, 50°, 130°, 170°, 250°, 290°

(ii) 0°, 135°, 180°, 225°, 315°, 360°