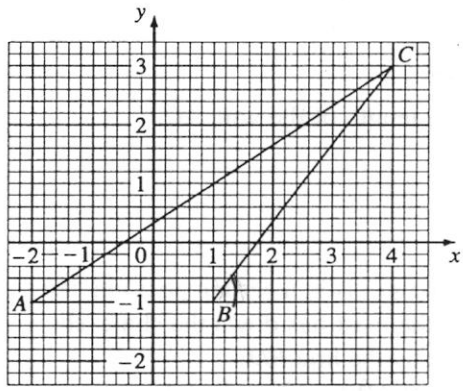
PAST EXAMINATION QUESTIONS

1. The diagram shows three points, $A(-2, -1)$, $B(1, -1)$ and $C(4, 3)$.

   Calculate

   (a) the area of triangle ABC,

   (b) the cosine of $A\hat{B}C$.



(N99/1/16)

2.

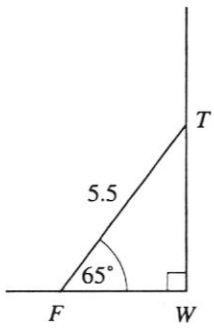


Diagram I

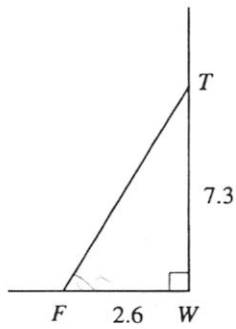


Diagram II

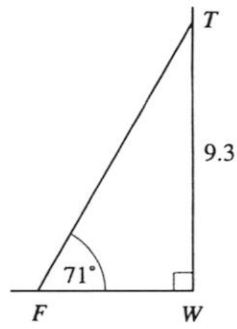


Diagram III

A ladder FT stands on horizontal ground at F and leans against a vertical wall at T. The point W, on the ground, is vertically below T. The ladder can be extended to various lengths. The diagrams above show three positions of this ladder.

(a) In Diagram I, $FT = 5.5$ m and $T\hat{F}W = 65°$. Calculate FW.

(b) In Diagram II, $TW = 7.3$ m and FW = 2.6 m. Calculate the angle which the ladder makes with the ground.

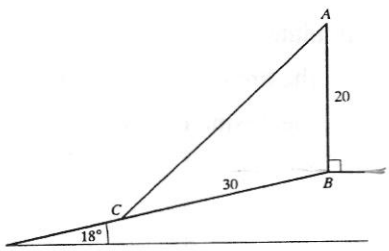
(c) In Diagram III, $TW = 9.3$ m and $T\hat{F}W = 71°$. Calculate by how much the ladder has been extended from its original length of 5.5 m. (N99/2/1)

3. A radio mast AB, of height 20 m, stands at the top of a slope which is inclined at 18° to the horizontal.

(a) The mast is supported by a wire AC attached to a point C on the slope, where $BC = 30$ m. Calculate

(i) $A\hat{B}C$,

(ii) the length of the wire AC.

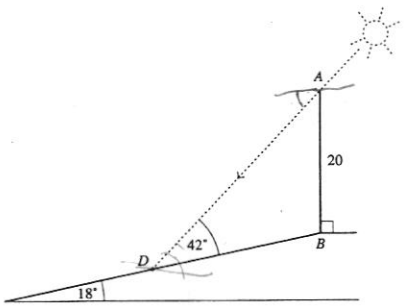


(b) When the sun is in a certain position, the shadow cast by the mast lies down the slope, shown in the diagram by the line BD.
Given that $A\hat{D}B = 42°$, calculate

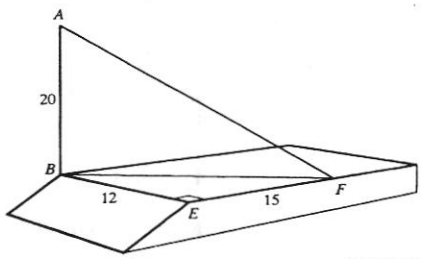
(i) the angle of elevation of the sun,

(ii) $D\hat{A}B$,

(iii) the length of the shadow BD.



(c) The mast is supported by another wire AF. The points B, E and F lie on horizontal ground.
Given that $B\hat{E}F = 90°$, $BE = 12$ m and $EF = 15$ m, calculate the length of the wire AF.



(N99/2/9)

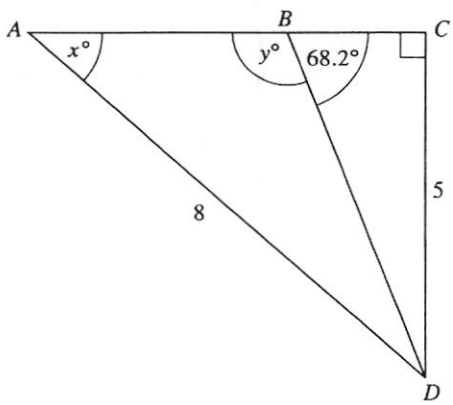
4. In the diagram, ABC is a straight line, $C\hat{B}D = 68.2°$, $B\hat{C}D = 90°$, $CD = 5$ cm and $AD = 8$ cm. Using as much of the information given in the table below as is necessary, find

	sin	cos	tan
68.2°	0.93	0.37	2.50

(a) $\sin x$, giving your answer as a fraction,

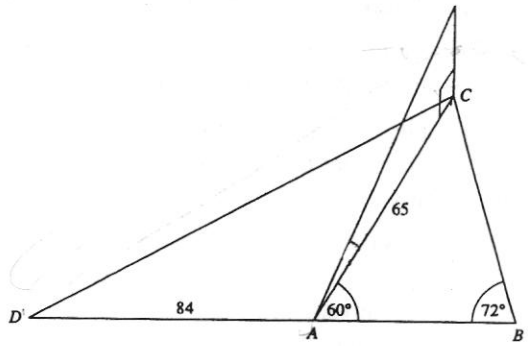
(b) $\cos y$,

(c) BC.



(N2000/1/1

5. The diagram shows two horizontal triangular fields, ABC and AC which are surrounded by hedges. It is given that DAB is a straight line, $AC = 65$ m, $C\hat{A}B = 60°$ and $A\hat{B}C = 72°$.



(a) Calculate the length of the hedge BC.

(b) The hedge AD has length 84 m.
Calculate

(i) the area of the field ACD,

(ii) the length of the hedge CD.

(c) A vertical tree is growing at C.
The angle of elevation of the top of the tree from A is 14°.

(i) Calculate the height of the tree.

(ii) A boy has climbed exactly half way up the tree. Calculate the angle of depression of D when viewed by the boy.

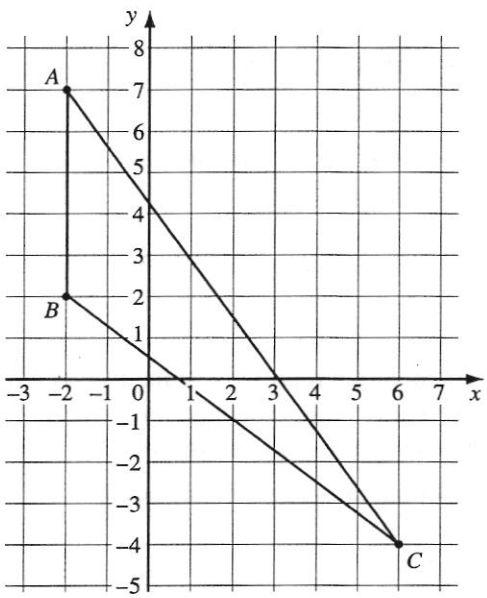
(N2000/2/8)

6. The diagram shows three points, $A(-2, 7)$, $B(-2, 2)$ and $C(6, -4)$.
Find

(a) the length BC,

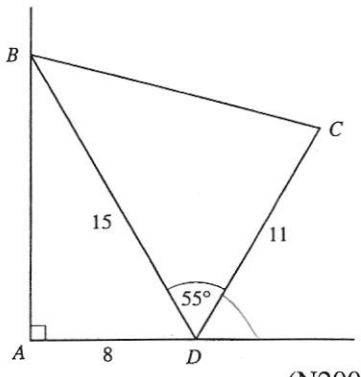
(b) the area of triangle ABC,

(c) the value of $\sin A\hat{B}C$.



(N2001/1/21)

7. In the diagram, AB is a vertical wall.
A beam, CD, of length 11 metres, rests with one end, D, on horizontal ground.
It is held in place by two cables, BC and BD.
Given that $AD = 8$ metres, $BD = 15$ metres and angle $BDC = 55°$, calculate



(a) the length of AB,

(b) the length of the cable BC,

(c) the angle between the beam CD and the ground.

(N2001/2/1)

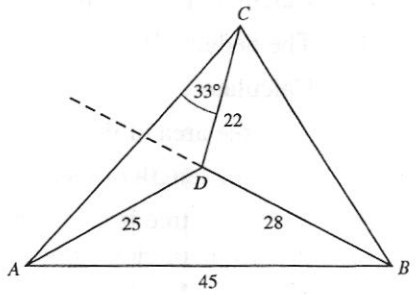
8. The diagram shows four points, A, B, C and D, on a piece of horizontal land.
It is given that $AB = 45$ metres, $AD = 25$ metres and $BD = 28$ metres.

(a) Calculate angle ADB.

(b) Given also that $CD = 22$ metres and that angle $ACD = 33°$, calculate angle ADC.

(c) The line BD is produced beyond D.
Calculate the shortest distance from C to this extended line.

(d) D is the foot of a vertical mast, DT.
The angle of elevation of the top of the mast, T, from A is 40°.
Calculate the angle of elevation of T from B.



(N2002/2/8)

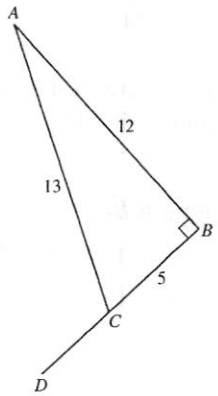
9. In the diagram, BCD is a straight line,
$BC = 5$ cm, $AB = 12$ cm, $AC = 13$ cm and $A\hat{B}C = 90°$.

Find

(a) $\tan B\hat{A}C$,

(b) $\cos A\hat{C}D$.

Give both answers as fractions.



(N2004/1/8)

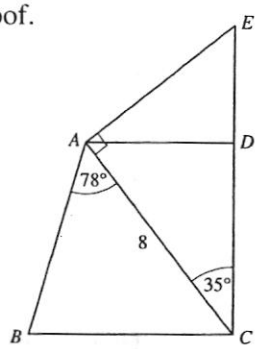
10. The diagram represents some beams which support part of a roof.
AD and BC are horizontal and CDE is vertical.
$AC = 8$ metres, $B\hat{A}C = 78°$, $A\hat{C}D = 35°$ and $C\hat{A}E = 90°$.

Calculate the length of the beam

(a) AD,

(b) CE,

(c) AB.



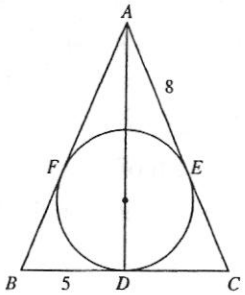
(N2004/2/1)

11. (a) The diagram shows a circle which passes through D, E and F.
AFB, BDC and CEA are tangents to the circle.
D is the midpoint of BC.

Given that $BD = 5$ cm and $AE = 8$ cm, find

(i) EC,

(ii) $C\hat{A}D$.

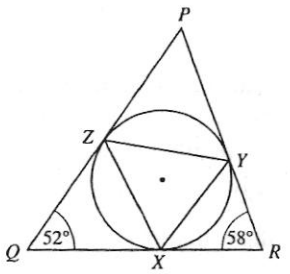


(b) The diagram shows a circle which passes through X, Y and Z.
PZQ, QXR and RYP are tangents to the circle.
Given that $P\hat{Q}R = 52°$ and $Q\hat{R}P = 58°$, calculate

(i) $Q\hat{P}R$,

(ii) $Q\hat{Z}X$,

(iii) $Z\hat{X}Y$.



(N2004/2/5)

12. Three paths, AB, BC and CA, run along the edges of a horizontal triangular field ABC.
$BC = 51$ m, $AC = 72$ m and angle $ACB = 81°$.

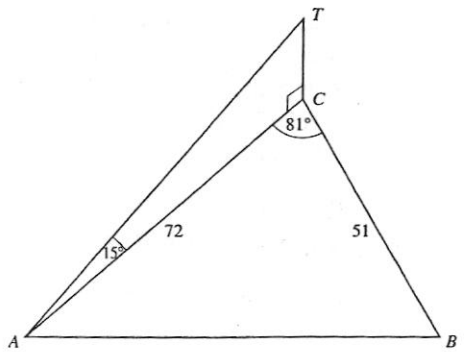
(a) Calculate the length of AB.

(b) Calculate the area of the field ABC.

(c) Calculate the shortest distance from C to AB.

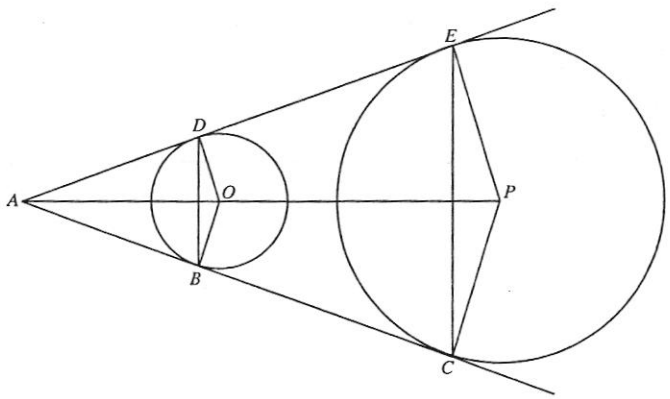
(d) A vertical tree, CT, has its base at C.
The angle of elevation of the top of the tree from A is 15°.
Calculate the height of the tree.

(e) John measured the largest angle of elevation of the top of the tree as seen from the path AB.
Calculate this angle of elevation.



(N2004/2/7)

13.



The diagram shows two circles with centres O and P.
ABC and ADE are tangents to the circles at B, C, D and E as shown.
AOP is a straight line.

(a) Giving a reason for your answer, write down angle ABO.

(b) It is given that $OB = 6$ cm, $AO = 13$ cm and $PC = 15$ cm.

(i) Show that angle $OAB = 27.5°$, correct to one decimal place.

(ii) Calculate AC.

(iii) Calculate CE.

(N2005/2/1)