Trigonometry
Difficulty: Medium

Question Paper 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Trigonometry
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 1

Time allowed: **102 minutes**

Score: **/89**

Percentage: **/100**

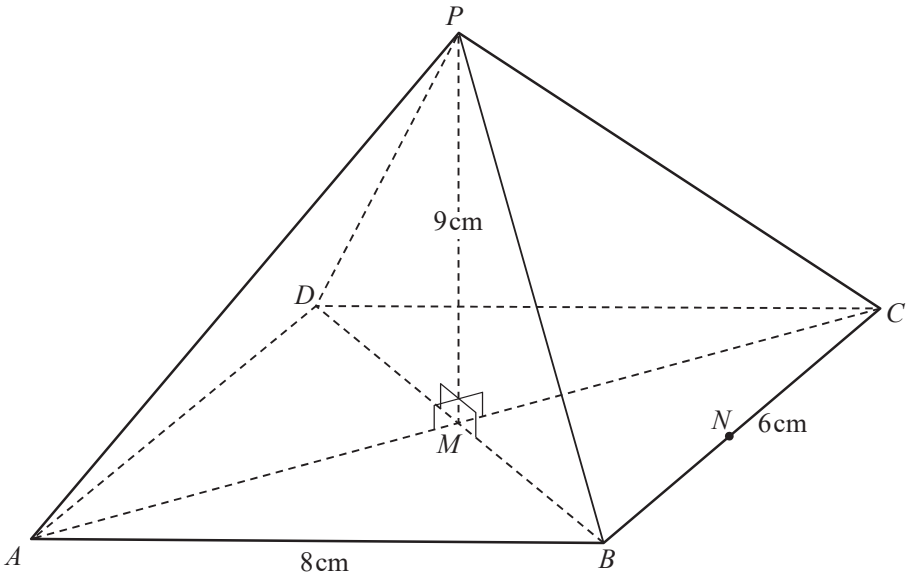
Grade Boundaries:

CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980) ~~Assembled by A.S.~~

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%



NOT TO SCALE

The diagram shows a pyramid on a rectangular base $ABCD$.
AC and BD intersect at M and P is vertically above M.
$AB = 8$ cm, $BC = 6$ cm and $PM = 9$ cm.

(a) N is the midpoint of BC.

Calculate angle PNM. [2]

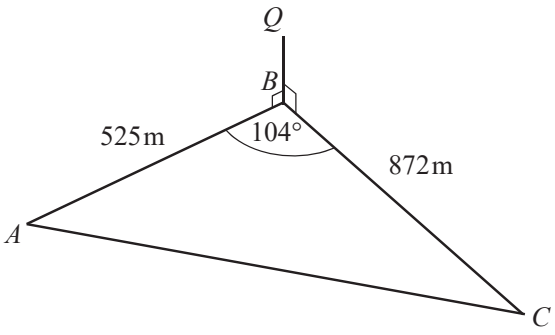
(b) Show that $BM = 5$ cm. [1]

(c) Calculate the angle between the edge PB and the base $ABCD$. [2]

(d) A point X is on PC so that $PX = 7.5$ cm.

Calculate BX. [6]

Question 2



NOT TO SCALE

ABC is a triangular field on horizontal ground.
There is a vertical pole BQ at B.
$AB = 525$ m, $BC = 872$ m and angle $ABC = 104°$.

(a) Use the cosine rule to calculate the distance AC. [4]

(b) The angle of elevation of Q from C is 1.0°.

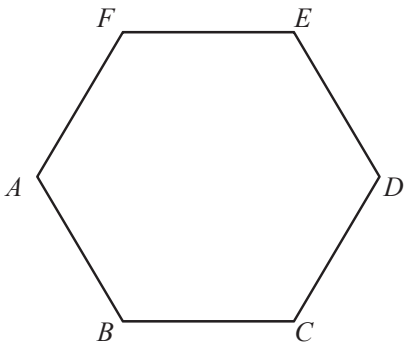
Showing all your working, calculate the angle of elevation of Q from A. [4]

(c) (i) Calculate the area of the field. ..... m^2 [2]

(ii) The field is drawn on a map with the scale 1 : 20 000.

Calculate the area of the field on the map in cm^2. .....cm^2 [2]

(a) The diagram shows a regular hexagon $ABCDEF$ of side 10cm.

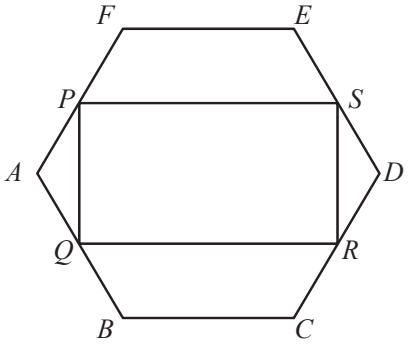


NOT TO SCALE

(i) Show that angle $BAF = 120°$. [2]

(ii) The vertices of a rectangle $PQRS$ touch the sides FA, AB, CD and DE.

PS is parallel to FE and $AP = x$ cm.



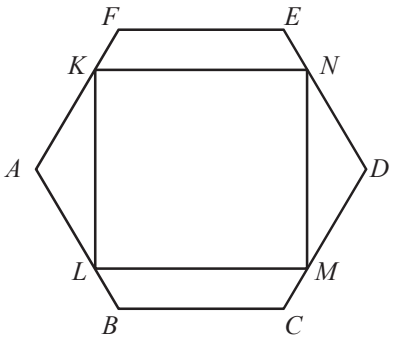
NOT TO SCALE

Use trigonometry to find the length of PQ in terms of x. [3]

(iii) $PF = (10 - x)$ cm.

Show that $PS = (20 - x)$ cm. [3]

(b)

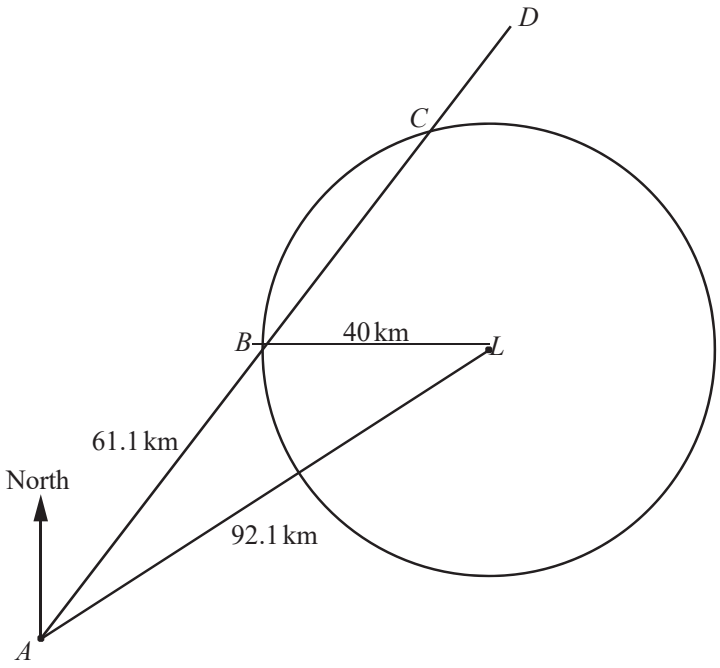


NOT TO SCALE

The diagram shows the vertices of a square *KLMN* touching the sides of the same hexagon *ABCDEF*, with *KN* parallel to *FE*.

Use your results from **part (a)(ii)** and **part (a)(iii)** to find the length of a side of the square.

[4]



NOT TO SCALE

The diagram shows the position of a port, A, and a lighthouse, L.
The circle, centre L and radius 40 km, shows the region where the light from the lighthouse can be seen.
The straight line, $ABCD$, represents the course taken by a ship after leaving the port.
When the ship reaches position B it is due west of the lighthouse.

$AL = 92.1$ km, $AB = 61.1$ km and $BL = 40$ km.

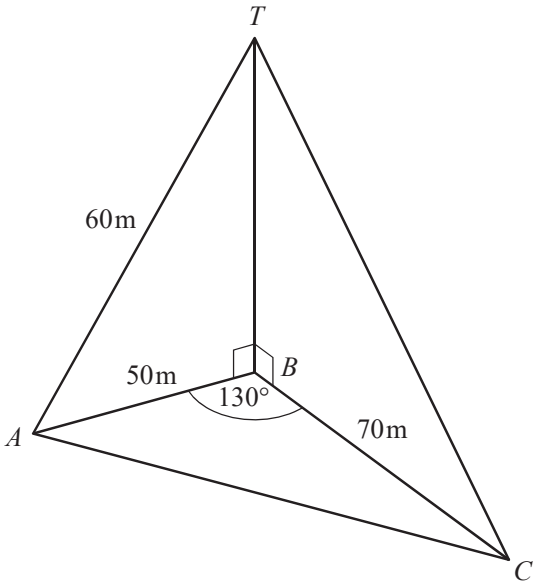
(a) Use the cosine rule to show that angle $ABL = 130.1°$, correct to 1 decimal place. [4]

(b) Calculate the bearing of the lighthouse, L, from the port, A. [4]

(c) The ship sails at a speed of 28 km/h.

Calculate the length of time for which the light from the lighthouse can be seen from the ship.
Give your answer correct to the nearest minute. [5]

(a)



NOT TO SCALE

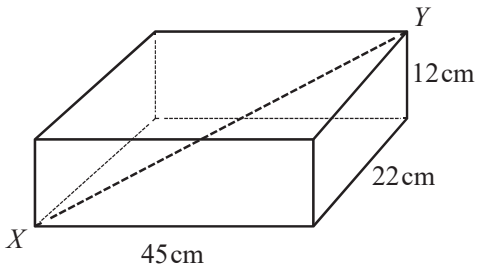
A, B and C are points on horizontal ground.
BT is a vertical pole.
$AT = 60$ m, $AB = 50$ m, $BC = 70$ m and angle $ABC = 130°$.

(i) Calculate the angle of elevation of T from C. [5]

(ii) Calculate the length AC. [4]

(iii) Calculate the area of triangle ABC. [2]

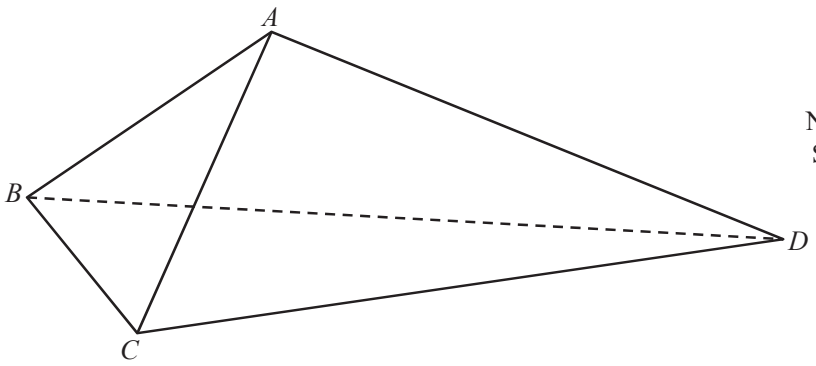
(b)



NOT TO SCALE

A cuboid has length 45 cm, width 22 cm and height 12 cm.

Calculate the length of the straight line XY. [4]



NOT TO SCALE

The diagram shows a tent $ABCD$.
The front of the tent is an isosceles triangle ABC, with $AB = AC$.
The sides of the tent are congruent triangles ABD and ACD.

(a) $BC = 1.2$ m and angle $ABC = 68°$.

Find AC. [3]

(b) $CD = 2.3$ m and $AD = 1.9$ m.

Find angle ADC. [4]

(c) The floor of the tent, triangle BCD, is also an isosceles triangle with $BD = CD$.

Calculate the area of the floor of the tent. [4]

(d) When the tent is on horizontal ground, A is a vertical distance 1.25 m above the ground.

Calculate the angle between AD and the ground. [3]

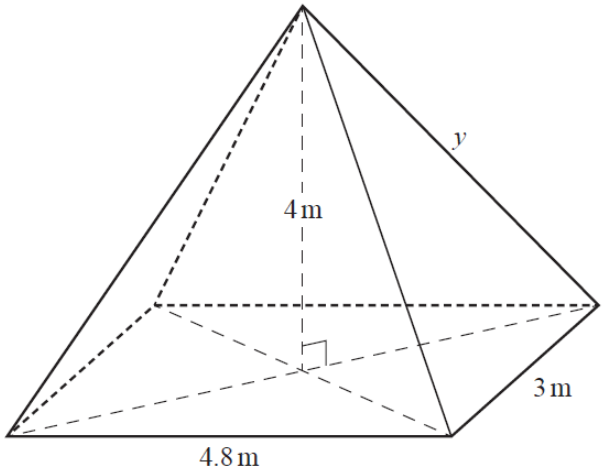
(a) Andrei stands on level horizontal ground, 294 m from the foot of a vertical tower which is 55 m high.

(i) Calculate the angle of elevation of the top of the tower. [2]

(ii) Andrei walks a distance x metres directly towards the tower.
The angle of elevation of the top of the tower is now 24.8°.

Calculate the value of x. [4]

(b) The diagram shows a pyramid with a horizontal rectangular base.



NOT TO SCALE

The rectangular base has length 4.8 m and width 3 m and the height of the pyramid is 4 m.

Calculate

(i) y, the length of a sloping edge of the pyramid, [4]

(ii) the angle between a sloping edge and the rectangular base of the pyramid. [2]

Trigonometry
Difficulty: Medium

Question Paper 2

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Trigonometry
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 2

Time allowed: **93 minutes**

Score: **/81**

Percentage: **/100**

Grade Boundaries:

CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

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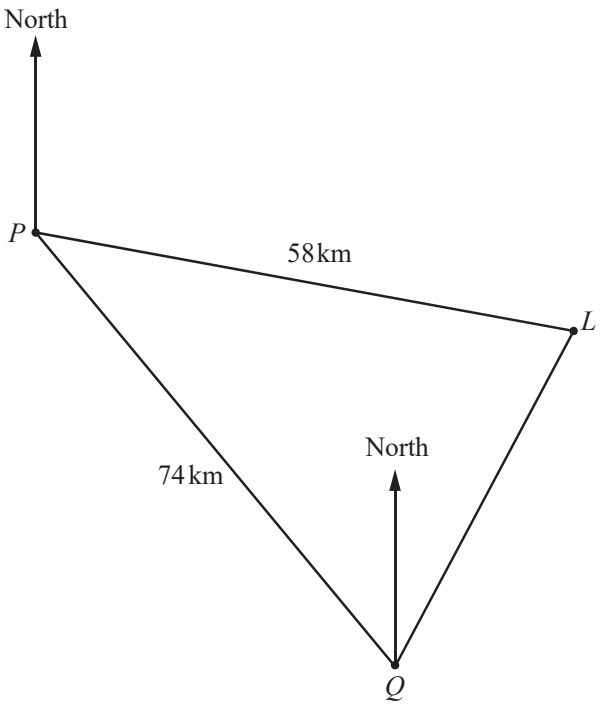


NOT TO SCALE

A ship sails from port P to port Q.
Q is 74 km from P on a bearing of 142°.
A lighthouse, L, is 58 km from P on a bearing of 110°.

(a) Show that the distance LQ is 39.5 km correct to 1 decimal place. [5]

(b) Use the sine rule to calculate angle PQL. [3]

(c) Find the bearing of

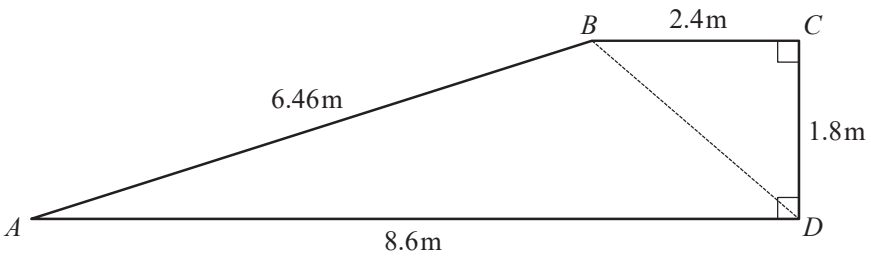
(i) P from Q, [2]

(ii) L from Q. [1]

(d) The ship takes 2 hours and 15 minutes to sail the 74 km from P to Q.

Calculate the average speed in knots.
[1 knot = 1.85 km/h] [3]

(e) Calculate the shortest distance from the lighthouse to the path of the ship. [3]



NOT TO SCALE

The diagram shows the cross section, *ABCD*, of a ramp.

(a) Calculate angle *DBC*. [2]

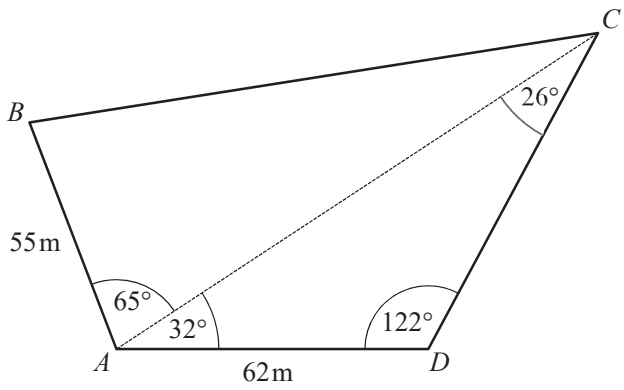
(b) (i) Show that *BD* is exactly 3 m. [2]

(ii) Use the cosine rule to calculate angle *ABD*. [4]

(c) The ramp is a prism of width 4 m.

Calculate the volume of this prism. [3]

A field, $ABCD$, is in the shape of a quadrilateral.
A footpath crosses the field from A to C.



NOT TO SCALE

(a) Use the sine rule to calculate the distance AC and show that it rounds to 119.9 m, to 1 decimal place. [3]

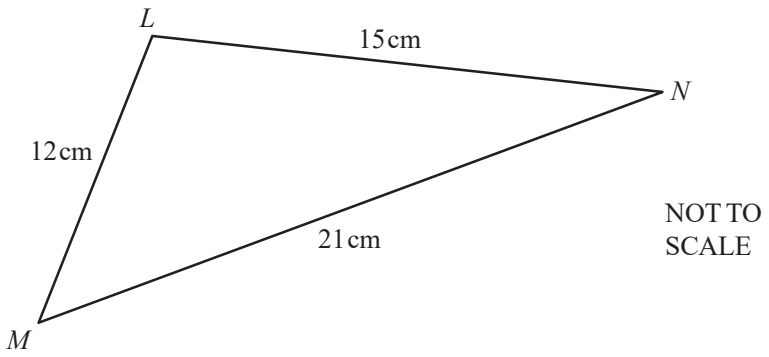
(b) Calculate the length of BC. [4]

(c) Calculate the area of triangle ACD. [2]

(d) The field is for sale at \$4.50 per square metre.

Calculate the cost of the field. [3]

(a)

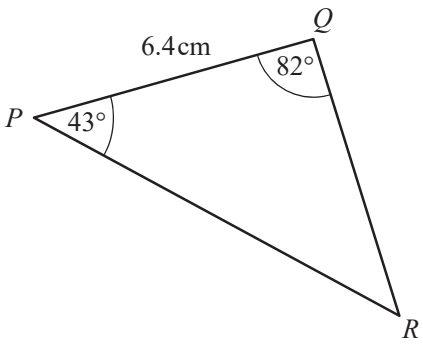


The diagram shows triangle LMN with $LM = 12$ cm, $LN = 15$ cm and $MN = 21$ cm.

(i) Calculate angle LMN.
Show that this rounds to 44.4°, correct to 1 decimal place. [4]

(ii) Calculate the area of triangle LMN. [2]

(b)

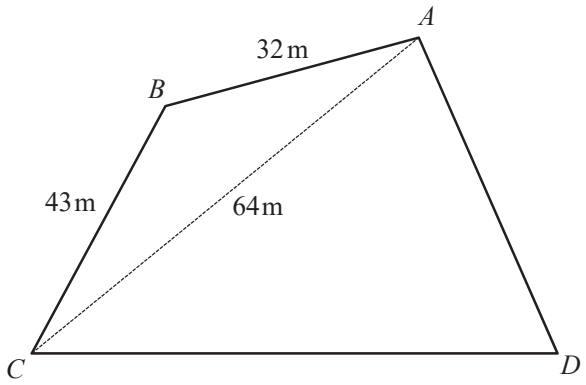


NOT TO SCALE

The diagram shows triangle PQR with $PQ = 6.4$cm, angle $PQR = 82°$ and angle $QPR = 43°$.

Calculate the length of PR. [4]

Question 5



NOT TO SCALE

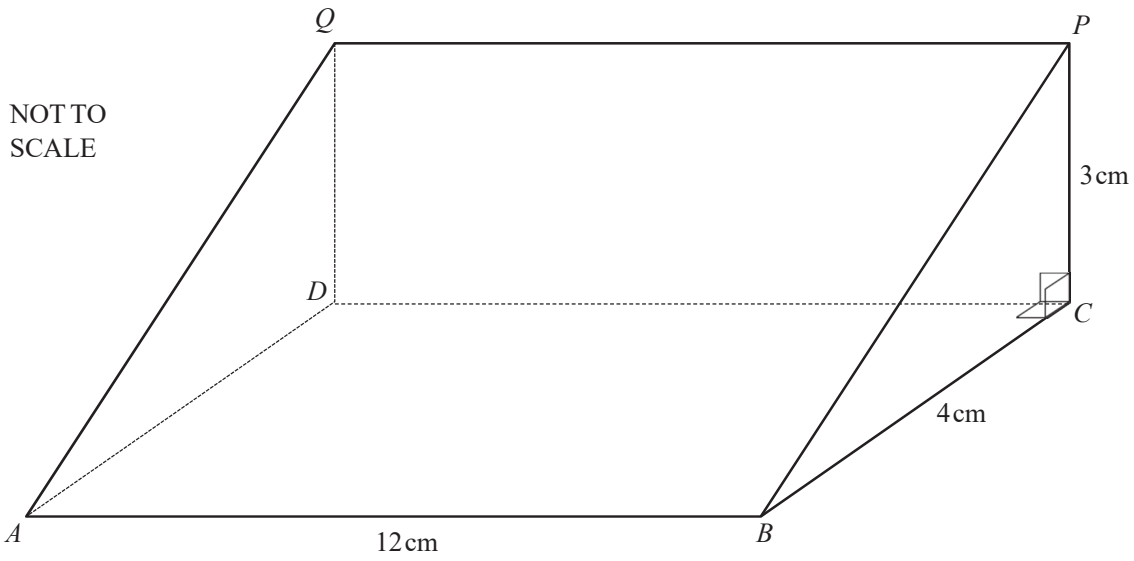
The diagram represents a field in the shape of a quadrilateral $ABCD$.
$AB = 32$ m, $BC = 43$ m and $AC = 64$ m.

(a) (i) Show clearly that angle $CAB = 37.0°$ correct to one decimal place. [4]

(ii) Calculate the area of the triangle ABC. [2]

(b) $CD = 70$ m and angle $DAC = 55°$.

Calculate the perimeter of the whole field $ABCD$. [6]



The diagram shows a triangular prism of length 12 cm.

The rectangle $ABCD$ is horizontal and the rectangle $DCPQ$ is vertical.

The cross-section is triangle PBC in which angle $BCP = 90°$, $BC = 4$ cm and $CP = 3$ cm.

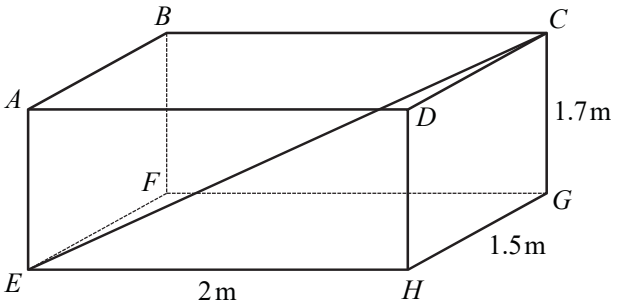
(a) (i) Calculate the length of AP. [3]

(ii) Calculate the angle of elevation of P from A. [2]

(b) (i) Calculate angle PBC. [2]

(ii) X is on BP so that angle $BXC = 120°$.

Calculate the length of XC. [3]



NOT TO SCALE

The diagram shows a box *ABCDEFGH* in the shape of a cuboid measuring 2 m by 1.5 m by 1.7 m.

(a) Calculate the length of the diagonal *EC*. [4]

(b) Calculate the angle between *EC* and the base *EFGH*. [3]

(c) (i) A rod has length 2.9 m, correct to 1 decimal place.

What is the upper bound for the length of the rod? [1]

(ii) Will the rod fit completely in the box?

Give a reason for your answer. [1]

Trigonometry
Difficulty: Medium

Question Paper 3

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Trigonometry
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 3

Time allowed: **91 minutes**

Score: **/79**

Percentage: **/100**

Grade Boundaries:

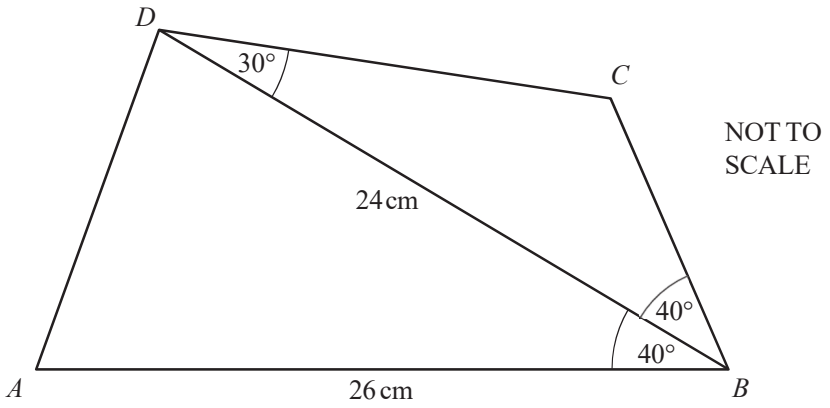
CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

Question 1



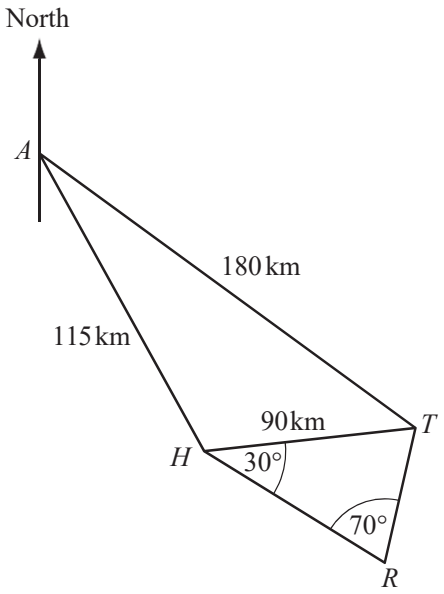
ABCD is a quadrilateral and *BD* is a diagonal.
AB = 26 cm, *BD* = 24 cm, angle *ABD* = 40°, angle *CBD* = 40° and angle *CDB* = 30°.

(a) Calculate the area of triangle *ABD*. [2]

(b) Calculate the length of *AD*. [4]

(c) Calculate the length of *BC*. [4]

(d) Calculate the shortest distance from the point *C* to the line *BD*. [2]



NOT TO SCALE

The diagram shows some straight line distances between Auckland (A), Hamilton (H), Tauranga (T) and Rotorua (R).
$AT = 180$ km, $AH = 115$ km and $HT = 90$ km.

(a) Calculate angle HAT.
Show that this rounds to 25.0°, correct to 3 significant figures. [4]

(b) The bearing of H from A is 150°.

Find the bearing of

(i) T from A, [1]

(ii) A from T. [1]

(c) Calculate how far T is east of A. [3]

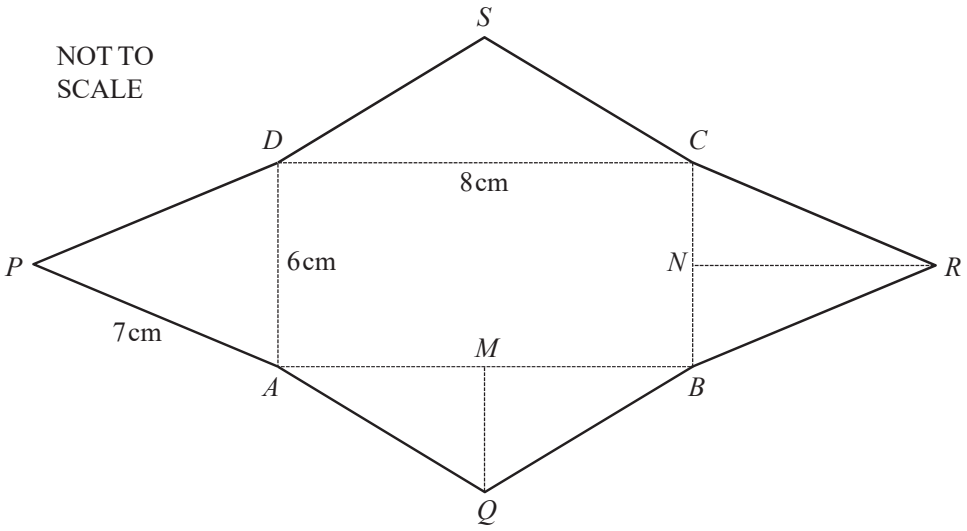
(d) Angle $THR = 30°$ and angle $HRT = 70°$.

Calculate the distance TR. [3]

(e) On a map the distance representing HT is 4.5cm.

The scale of the map is $1 : n$.

Calculate the value of n. [2]



The diagram above shows the net of a pyramid.

The base $ABCD$ is a rectangle 8 cm by 6 cm.

All the sloping edges of the pyramid are of length 7 cm.

M is the mid-point of AB and N is the mid-point of BC.

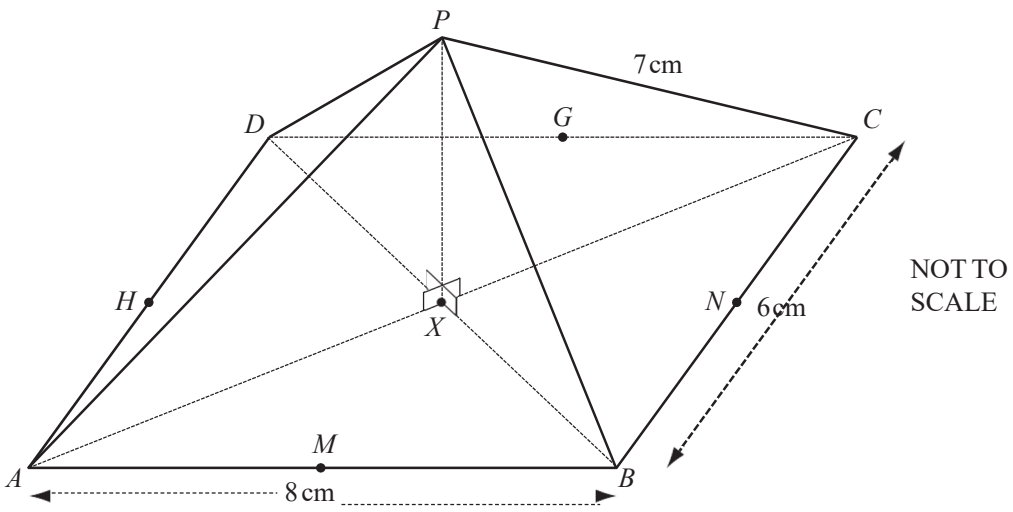
(a) Calculate the length of

(i) QM, [2]

(ii) RN. [1]

(b) Calculate the surface area of the pyramid. [2]

(c)



The net is made into a pyramid, with P, Q, R and S meeting at P.

The mid-point of CD is G and the mid-point of DA is H.

The diagonals of the rectangle $ABCD$ meet at X.

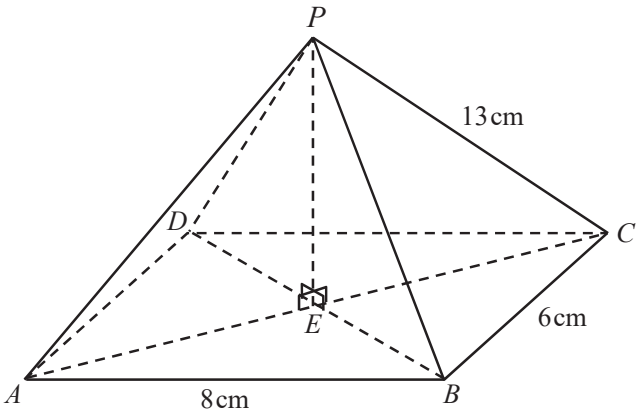
(i) Show that the height, PX, of the pyramid is 4.90 cm, correct to 2 decimal places. [2]

(ii) Calculate angle PNX. [2]

(iii) Calculate angle HPN. [2]

(iv) Calculate the angle between the edge PA and the base $ABCD$. [3]

(v) Write down the vertices of a triangle which is a plane of symmetry of the pyramid. [1]



NOT TO SCALE

The diagram shows a pyramid on a horizontal rectangular base $ABCD$.
The diagonals of $ABCD$ meet at E.
P is vertically above E.
$AB = 8$ cm, $BC = 6$ cm and $PC = 13$ cm.

(a) Calculate PE, the height of the pyramid. [3]

(b) Calculate the volume of the pyramid.

[The volume of a pyramid is given by $\frac{1}{3}$ × area of base × height.] [2]

(c) Calculate angle PCA. [2]

(d) M is the mid-point of AD and N is the mid-point of BC.
Calculate angle MPN.

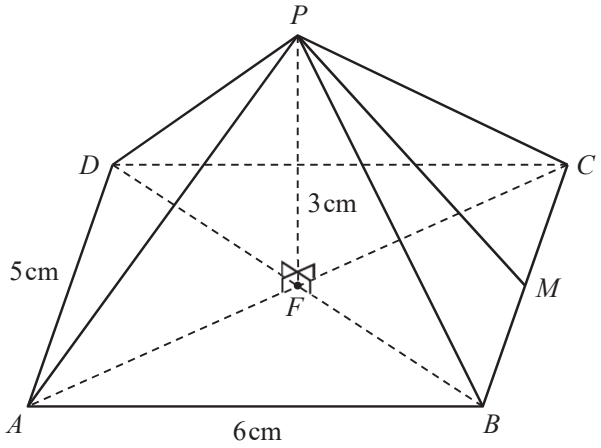
[3]

(e) (i) Calculate angle PBC. [2]

(ii) K lies on PB so that $BK = 4$ cm.
Calculate the length of KC. [3]

7

NOT TO SCALE



The diagram shows a pyramid on a rectangular base $ABCD$, with $AB = 6$ cm and $AD = 5$ cm.
The diagonals AC and BD intersect at F.
The vertical height $FP = 3$ cm.

(a) How many planes of symmetry does the pyramid have? [1]

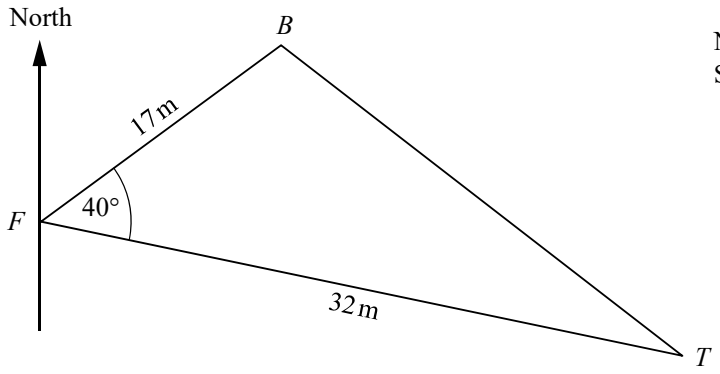
(b) Calculate the volume of the pyramid.

[The volume of a pyramid is $\frac{1}{3}$ × area of base × height.] [2]

(c) The mid-point of BC is M.
Calculate the angle between PM and the base. [2]

(d) Calculate the angle between PB and the base. [4]

(e) Calculate the length of PB. [2]



Felipe (F) stands 17 metres from a bridge (B) and 32 metres from a tree (T).
The points F, B and T are on level ground and angle BFT # 40°.

(a) Calculate

(i) the distance BT, [4]

[3]

(ii) the angle BTF.

(b) The bearing of B from F is 085°. Find the bearing of

(i) T from F, [1]

(ii) F from T, [1]

(iii) B from T. [1]

(c) The top of the tree is 30 metres vertically above T. [2]
Calculate the angle of elevation of the top of the tree from F.

Trigonometry
Difficulty: Hard

Question Paper 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Trigonometry
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 1

Time allowed: **101 minutes**

Score: **/88**

Percentage: **/100**

Grade Boundaries:

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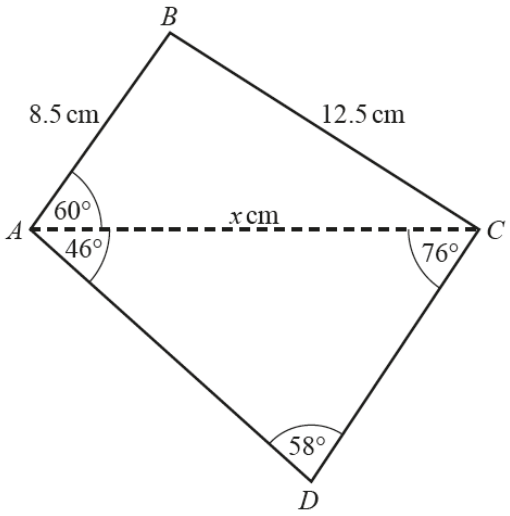
CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%



NOT TO SCALE

The diagram shows a quadrilateral $ABCD$.

(a) The length of AC is x cm.

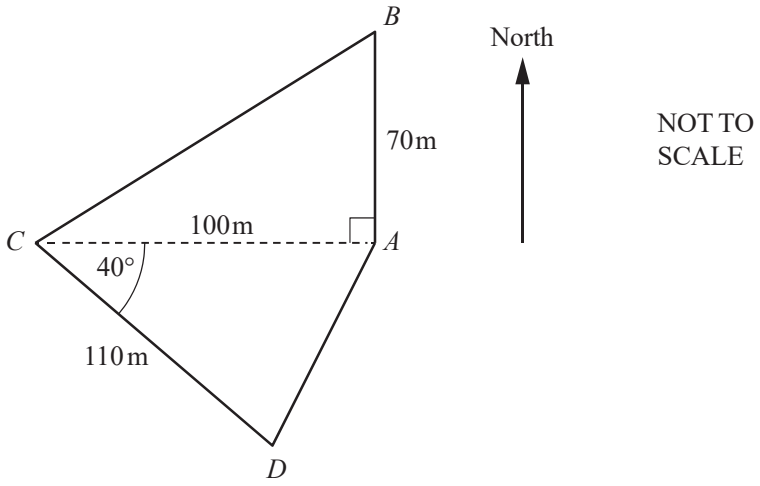
Use the cosine rule in triangle ABC to show that $2x^2 - 17x - 168 = 0$. [4]

(b) Solve the equation $2x^2 - 17x - 168 = 0$.
Show all your working and give your answers correct to 2 decimal places. [4]

(c) Use the sine rule to calculate the length of CD. [3]

(d) Calculate the area of the quadrilateral $ABCD$. [3]

Question 2



The diagram shows a field *ABCD*.

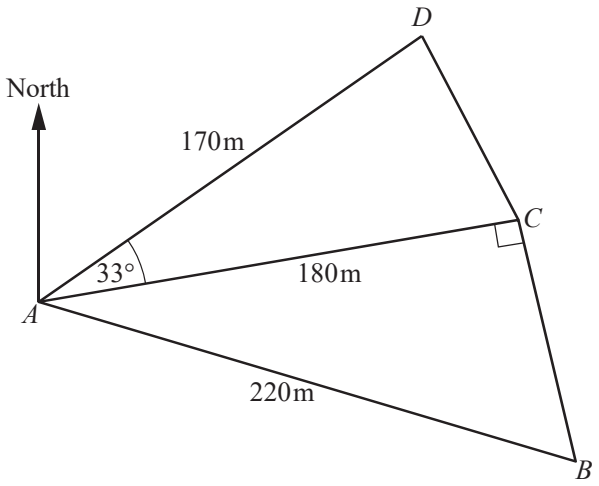
(a) Calculate the area of the field *ABCD*. [3]

(b) Calculate the perimeter of the field *ABCD*. [5]

(c) Calculate the shortest distance from A to CD. [2]

(d) B is due north of A.

Find the bearing of C from B. [3]



NOT TO SCALE

The diagram shows five straight footpaths in a park.
$AB = 220$ m, $AC = 180$ m and $AD = 170$ m.
Angle $ACB = 90°$ and angle $DAC = 33°$.

(a) Calculate BC. [3]

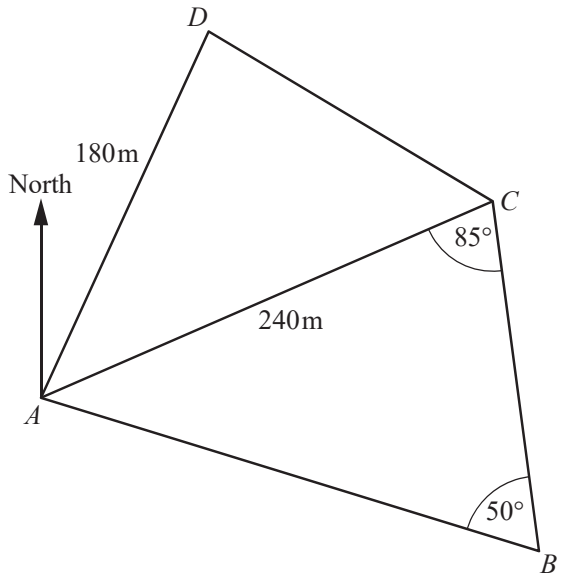
(b) Calculate CD. [4]

(c) Calculate the shortest distance from D to AC. [2]

(d) The bearing of D from A is 047°.

Calculate the bearing of B from A. [3]

(e) Calculate the area of the quadrilateral $ABCD$. [3]



NOT TO SCALE

The diagram shows a field, $ABCD$.
$AD = 180$ m and $AC = 240$ m.
Angle $ABC = 50°$ and angle $ACB = 85°$.

(a) Use the sine rule to calculate AB. [3]

(b) The area of triangle $ACD = 12\,000\,\text{m}^2$.

Show that angle $CAD = 33.75°$, correct to 2 decimal places. [3]

(c) Calculate BD. [5]

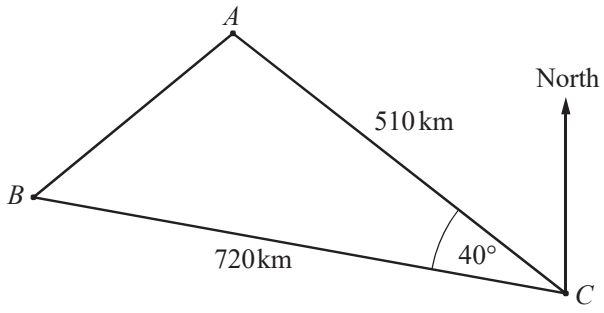
(d) The bearing of D from A is 030°.

Find the bearing of

(i) B from A, [1]

(ii) A from B. [2]

NOT TO SCALE



A plane flies from A to C and then from C to B.
$AC = 510$ km and $CB = 720$ km.
The bearing of C from A is 135° and angle $ACB = 40°$.

(a) Find the bearing of

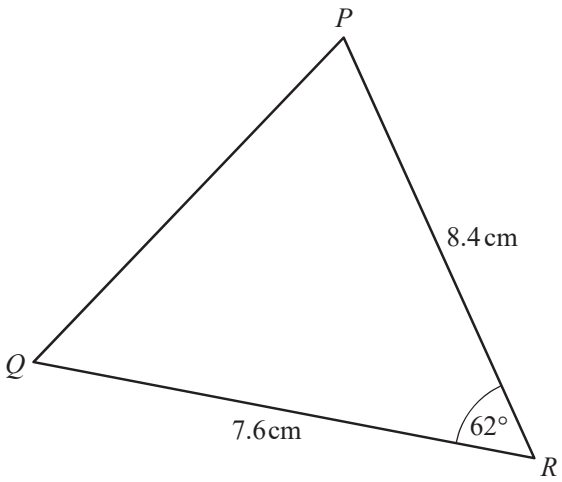
(i) B from C, [2]

(ii) C from B. [2]

(b) Calculate AB and show that it rounds to 464.7 km, correct to 1 decimal place. [4]

(c) Calculate angle ABC. [3]

(a)



NOT TO SCALE

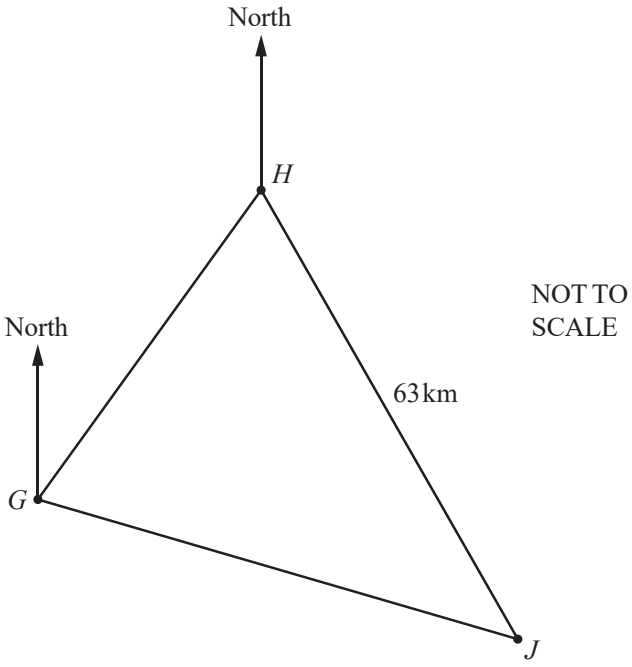
In the triangle PQR, $QR = 7.6$ cm and $PR = 8.4$ cm.
Angle $QRP = 62°$.

Calculate

(i) PQ, [4]

(ii) the area of triangle PQR. [2]

(b)

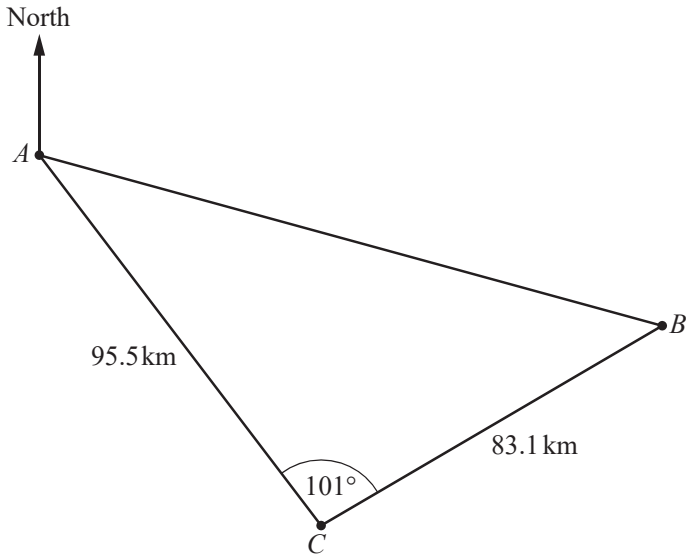


The diagram shows the positions of three small islands G, H and J.
The bearing of H from G is 045°.
The bearing of J from G is 126°.
The bearing of J from H is 164°.
The distance HJ is 63 km.

Calculate the distance GJ. [5]

Question 7

The diagram shows the positions of two ships, A and B, and a coastguard station, C.



NOT TO SCALE

(a) Calculate the distance, AB, between the two ships.
Show that it rounds to 138km, correct to the nearest kilometre.

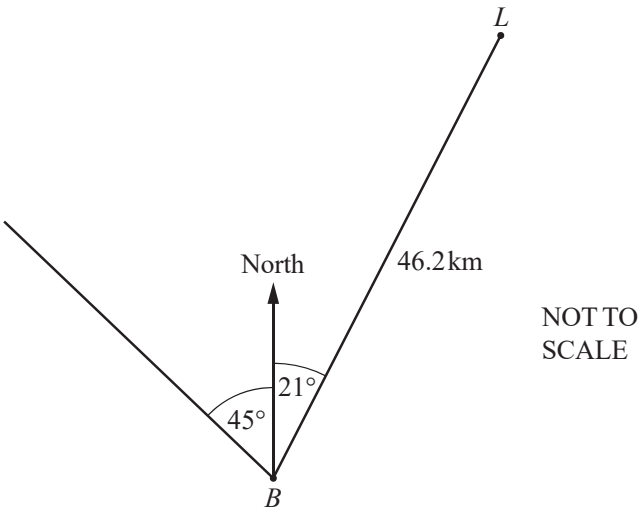
[4]

(b) The bearing of the coastguard station C from ship A is 146°.

Calculate the bearing of ship B from ship A.

[4]

(c)



At noon, a lighthouse, L, is 46.2km from ship B on the bearing 021°.
Ship B sails north west.

Calculate the distance ship B must sail from its position at noon to be at its closest distance to the lighthouse.

[2]

Trigonometry
Difficulty: Hard

Question Paper 2

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Trigonometry
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 2

Time allowed: **99 minutes**

Score: **/86**

Percentage: **/100**

Grade Boundaries:

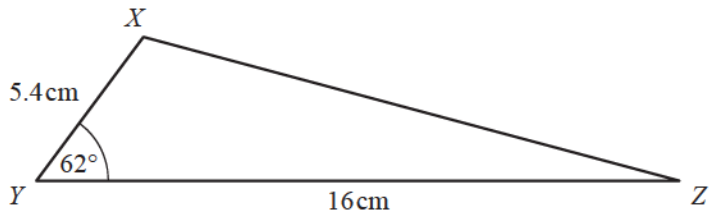
CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980) ~~Assembled by A-S~~

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

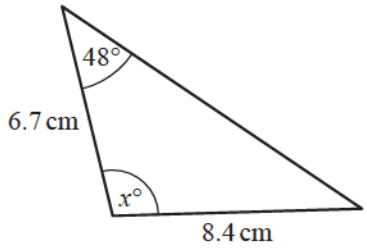
(a)



NOT TO SCALE

Show that the area of triangle XYZ is $38.1\,cm^2$, correct to 1 decimal place. [2]

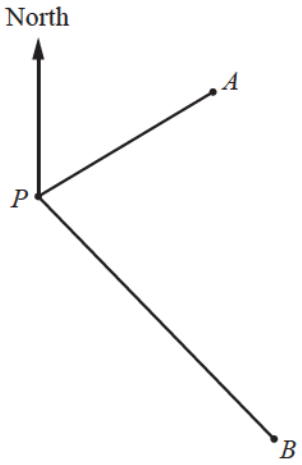
(b)



NOT TO SCALE

Calculate the value of x. [4]

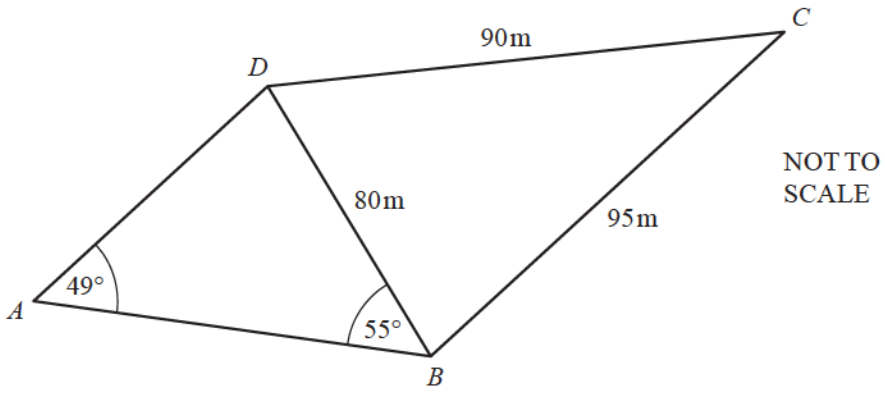
(c)



NOT TO SCALE

Ship A is 180 kilometres from port P on a bearing of 063°.
Ship B is 245 kilometres from P on a bearing of 146°.

Calculate AB, the distance between the two ships. [5]



The diagram shows a quadrilateral $ABCD$.
Angle $BAD = 49°$ and angle $ABD = 55°$.
$BD = 80\,\text{m}$, $BC = 95\,\text{m}$ and $CD = 90\,\text{m}$.

(a) Use the sine rule to calculate the length of AD. [3]

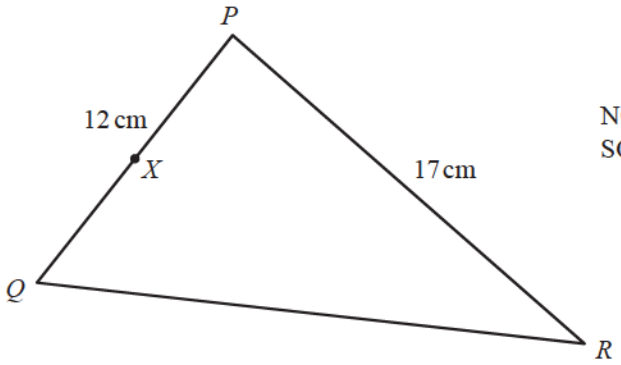
(b) Use the cosine rule to calculate angle BCD. [4]

(c) Calculate the area of the quadrilateral $ABCD$. [3]

(d) The quadrilateral represents a field.
Corn seeds are sown across the whole field at a cost of \$3250 per hectare.

Calculate the cost of the corn seeds used.
1 hectare = 10 000 m^2 [3]

(a)



NOT TO SCALE

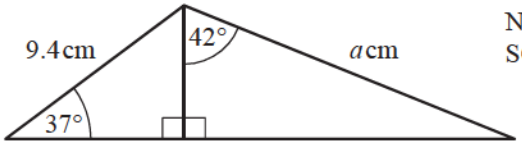
The diagram shows triangle PQR with $PQ = 12$ cm and $PR = 17$ cm.
The area of triangle PQR is 97 cm^2 and angle QPR is acute.

(i) Calculate angle QPR. [3]

(ii) The midpoint of PQ is X.

Use the cosine rule to calculate the length of XR. [4]

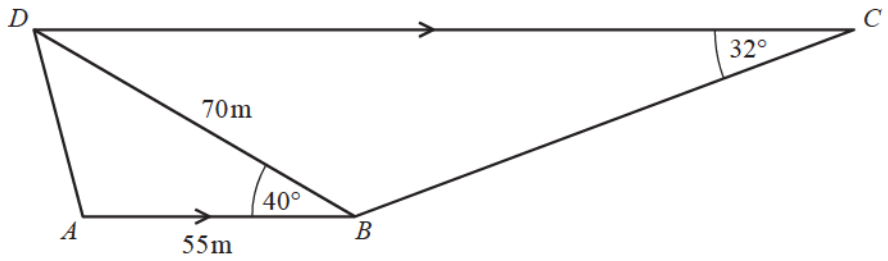
(b)



Calculate the value of a. [4]

(c) $\sin x = \cos 40°, \quad 0° \leqslant x \leqslant 180°$

Find the two values of x. [2]



NOT TO SCALE

The diagram shows a school playground $ABCD$.
$ABCD$ is a trapezium.
$AB = 55$ m, $BD = 70$ m, angle $ABD = 40°$ and angle $BCD = 32°$.

(a) Calculate AD. [4]

(b) Calculate BC. [4]

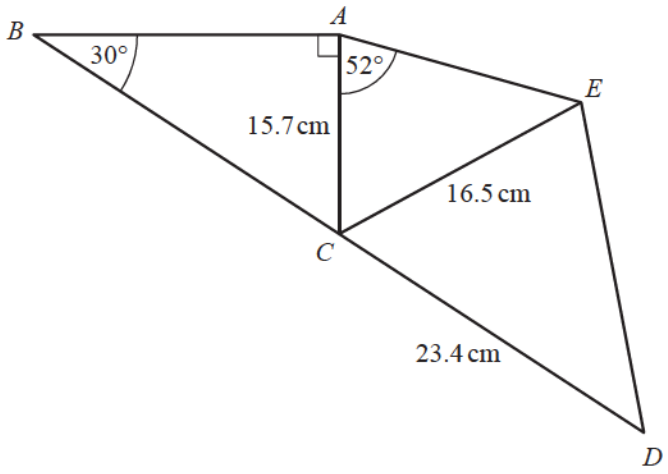
(c) (i) Calculate the area of the playground $ABCD$. [3]

(ii) An accurate plan of the school playground is to be drawn to a scale of 1:200 .

Calculate the area of the school playground on the plan.
Give your answer in cm^2. [2]

(d) A fence, BD, divides the playground into two areas.

Calculate the shortest distance from A to BD. [2]



NOT TO SCALE

In the diagram, BCD is a straight line and $ABDE$ is a quadrilateral.
Angle $BAC = 90°$, angle $ABC = 30°$ and angle $CAE = 52°$.
$AC = 15.7$ cm, $CE = 16.5$ cm and $CD = 23.4$ cm.

(a) Calculate BC. [3]

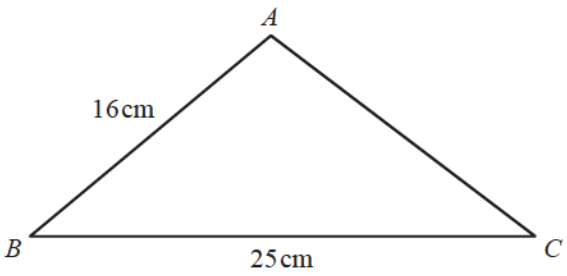
(b) Use the sine rule to calculate angle AEC.
Show that it rounds to 48.57°, correct to 2 decimal places. [3]

(c) (i) Show that angle $ECD = 40.6°$, correct to 1 decimal place. [2]

(ii) Calculate DE. [4]

(d) Calculate the area of the quadrilateral $ABDE$. [4]

Question 6



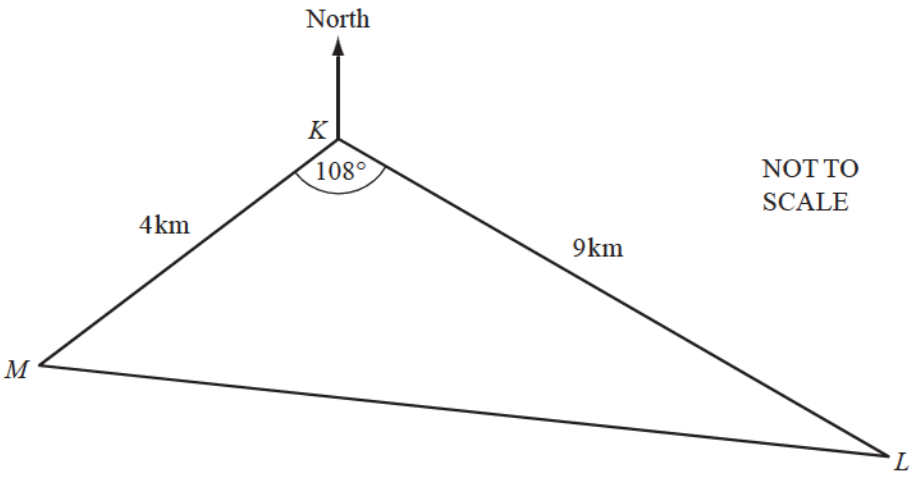
NOT TO SCALE

The area of triangle ABC is 130 cm^2.
$AB = 16$ cm and $BC = 25$ cm.

(a) Show clearly that angle $ABC = 40.5°$, correct to one decimal place. [3]

(b) Calculate the length of AC. [4]

(c) Calculate the shortest distance from A to BC. [2]



Three buoys K, L and M show the course of a boat race.
$MK = 4$ km, $KL = 9$ km and angle $MKL = 108°$.

(a) Calculate the distance ML. [4]

(b) The bearing of L from K is 125°.

(i) Calculate how far L is south of K. [3]

(ii) Find the three figure bearing of K from M. [2]

Trigonometry
Difficulty: Hard

Question Paper 3

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Trigonometry
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 3

Time allowed: **99 minutes**

Score: **/86**

Percentage: **/100**

Grade Boundaries:

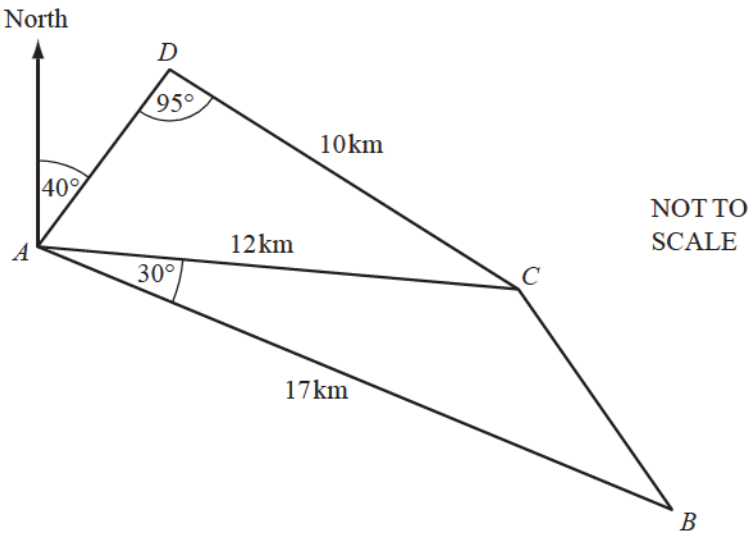
CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

Question 1



The diagram shows straight roads connecting the towns A, B, C and D.

$AB = 17$ km, $AC = 12$ km and $CD = 10$ km.

Angle $BAC = 30°$ and angle $ADC = 95°$.

(a) Calculate angle CAD. [3]

(b) Calculate the distance BC. [4]

(c) The bearing of D from A is 040°.

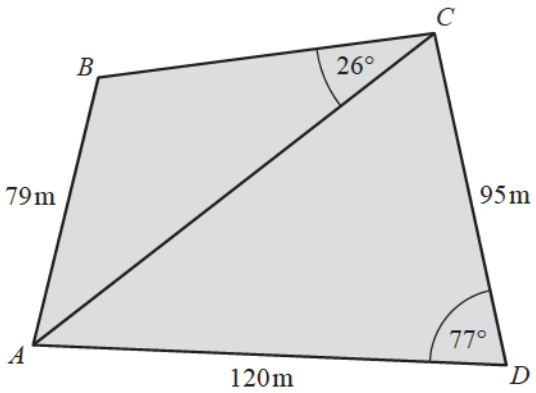
Find the bearing of

(i) B from A, [1]

(ii) A from B. [1]

(d) Angle ACB is obtuse.

Calculate angle BCD. [4]



NOT TO SCALE

The quadrilateral $ABCD$ represents an area of land.
There is a straight road from A to C.
$AB = 79$ m, $AD = 120$ m and $CD = 95$ m.
Angle $BCA = 26°$ and angle $CDA = 77°$.

(a) Show that the length of the road, AC, is 135 m correct to the nearest metre. [4]

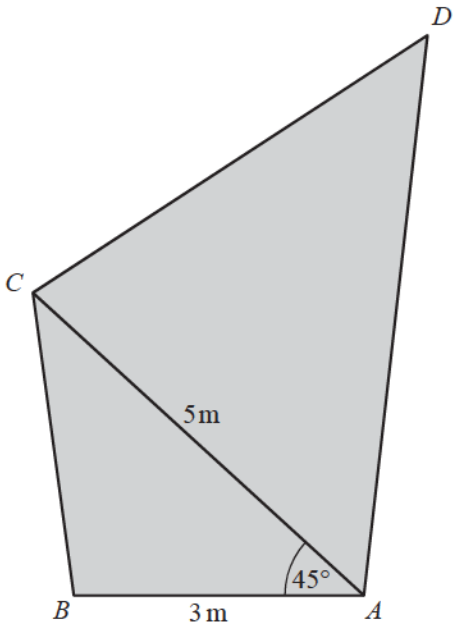
(b) Calculate the size of the obtuse angle ABC. [4]

(c) A straight path is to be built from B to the nearest point on the road AC.

Calculate the length of this path. [3]

(d) Houses are to be built on the land in triangle ACD.
Each house needs at least 180 m^2 of land.

Calculate the maximum number of houses which can be built.
Show all of your working. [4]



NOT TO SCALE

Parvatti has a piece of canvas $ABCD$ in the shape of an irregular quadrilateral.

$AB = 3$ m, $AC = 5$ m and angle $BAC = 45°$.

(a) (i) Calculate the length of BC and show that it rounds to 3.58 m, correct to 2 decimal places.

You must show all your working. [4]

(ii) Calculate angle BCA. [3]

(b) $AC = CD$ and angle $CDA = 52°$.

(i) Find angle DCA. [1]

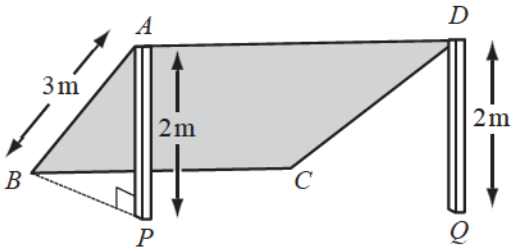
(ii) Calculate the area of the canvas. [3]

(c) Parvatti uses the canvas to give some shade.

She attaches corners A and D to the top of vertical poles, AP and DQ, each of height 2 m.

Corners B and C are pegged to the horizontal ground.

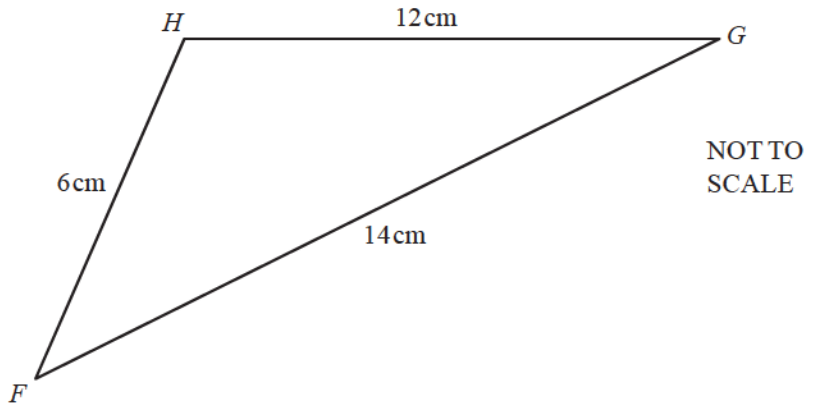
AB is a straight line and angle $BPA = 90°$.



NOT TO SCALE

Calculate angle PAB. [2]

(a)

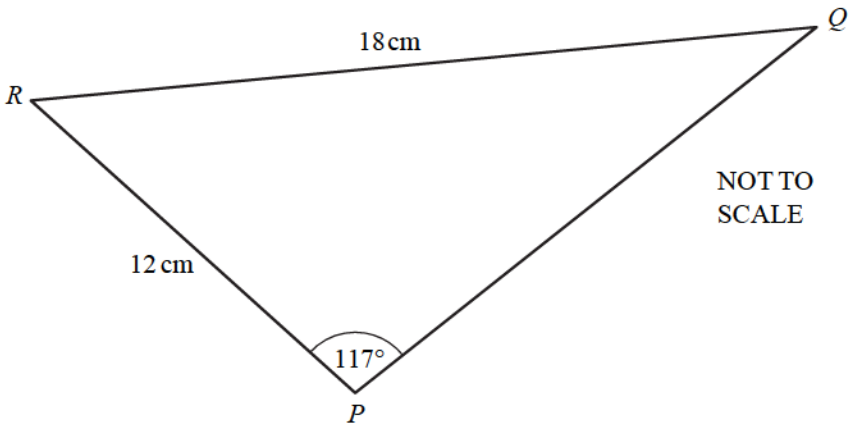


The diagram shows triangle FGH, with $FG = 14$ cm, $GH = 12$ cm and $FH = 6$ cm.

(i) Calculate the size of angle HFG. [4]

(ii) Calculate the area of triangle FGH. [2]

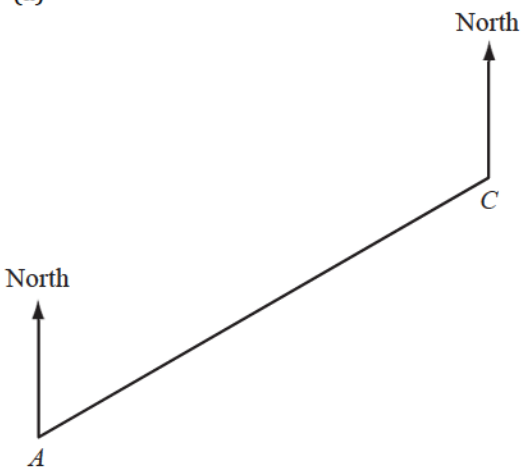
(b)



The diagram shows triangle PQR, with $RP = 12$ cm, $RQ = 18$cm and angle $RPQ = 117°$.

Calculate the size of angle RQP. [3]

(a)



The scale drawing shows the positions of two towns A and C on a map.
On the map, 1 centimetre represents 20 kilometres.

(i) Find the distance in kilometres from town A to town C. [2]

(ii) Measure and write down the bearing of town C from town A. [1]

(iii) Town B is 140 km from town C on a bearing of 150°.

Mark accurately the position of town B on the scale drawing. [2]

(iv) Find the bearing of town C from town B. [1]

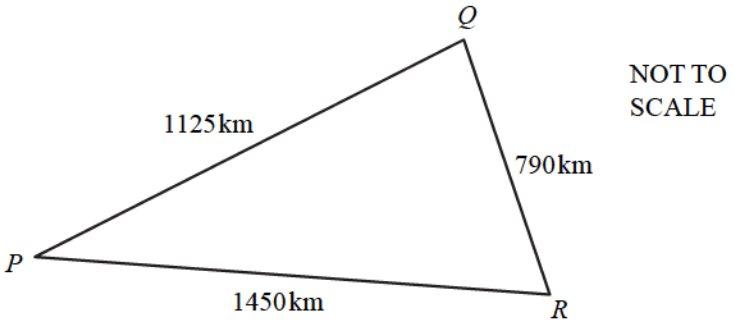
(v) A lake on the map has an area of 0.15 cm^2.

Work out the actual area of the lake. [2]

(b) A plane leaves town C at 11 57 and flies 1500 km to another town, landing at 14 12.

Calculate the average speed of the plane. [3]

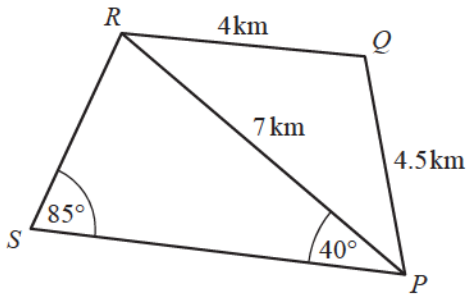
(c)



NOT TO SCALE

The diagram shows the distances between three towns P, Q and R.

Calculate angle PQR. [4]



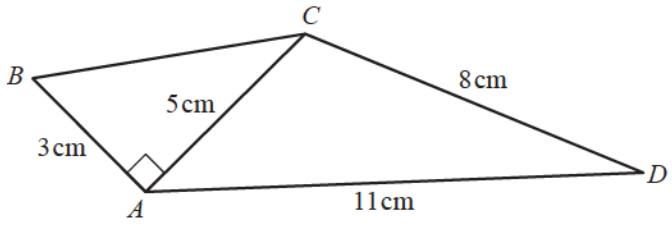
NOT TO SCALE

The diagram shows five straight roads.
$PQ = 4.5$ km, $QR = 4$ km and $PR = 7$ km.
Angle $RPS = 40°$ and angle $PSR = 85°$.

(a) Calculate angle PQR and show that it rounds to 110.7°. [4]

(b) Calculate the length of the road RS and show that it rounds to 4.52 km. [3]

(c) Calculate the area of the quadrilateral $PQRS$.
[Use the value of 110.7° for angle PQR and the value of 4.52 km for RS.] [5]



NOT TO SCALE

In the quadrilateral $ABCD$, $AB = 3$ cm, $AD = 11$ cm and $DC = 8$ cm.
The diagonal $AC = 5$ cm and angle $BAC = 90°$.

Calculate

(a) the length of BC, [2]

(b) angle ACD, [4]

(c) the area of the quadrilateral $ABCD$. [3]

Trigonometry
Difficulty: Hard

Question Paper 4

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Trigonometry
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 4

Time allowed: **83 minutes**

Score: **/72**

Percentage: **/100**

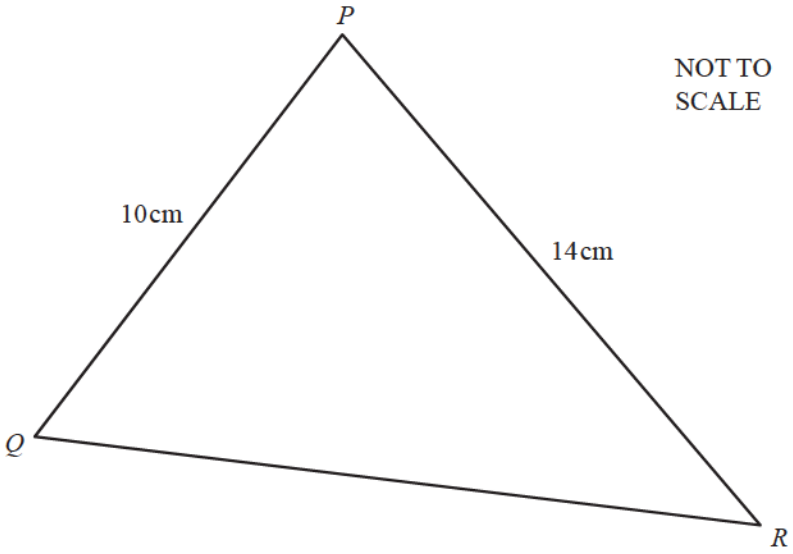
Grade Boundaries:

CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

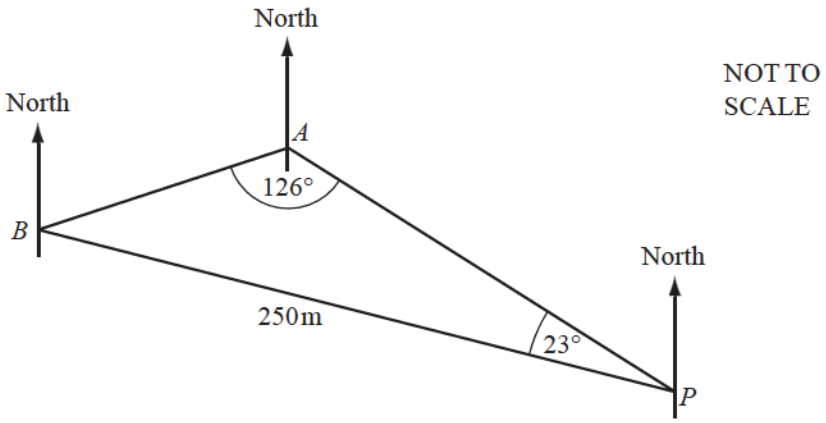


In triangle PQR, angle QPR is acute, $PQ = 10$ cm and $PR = 14$ cm.

(a) The area of triangle PQR is $48\ \text{cm}^2$.

Calculate angle QPR and show that it rounds to 43.3°, correct to 1 decimal place.
You must show all your working. [3]

(b) Calculate the length of the side QR. [4]



The diagram shows three straight horizontal roads in a town, connecting points P, A and B.

PB =250 m, angle APB = 23° and angle BAP = 126°.

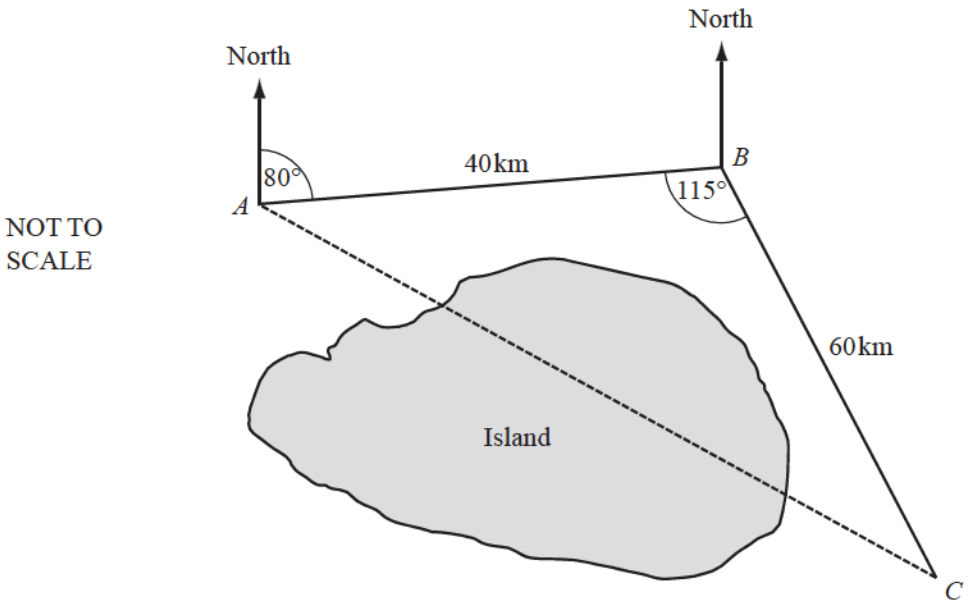
(a) Calculate the length of the road AB. [3]

(b) The bearing of A from P is 303°.

Find the bearing of

(i) B from P, [1]

(ii) A from B. [2]



To avoid an island, a ship travels 40 kilometres from A to B and then 60 kilometres from B to C.

The bearing of B from A is 080° and angle ABC is 115°.

(a) The ship leaves A at 11 55.

It travels at an average speed of 35 km/h.

Calculate, to the nearest minute, the time it arrives at C. [3]

(b) Find the bearing of

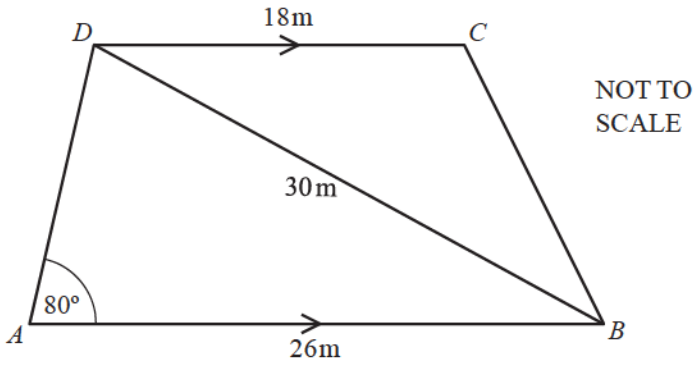
(i) A from B, [1]

(ii) C from B. [1]

(c) Calculate the straight line distance AC. [4]

(d) Calculate angle BAC. [3]

(e) Calculate how far C is east of A. [3]



The diagram shows the plan of a garden.

The garden is a trapezium with $AB = 26$ metres, $DC = 18$ metres and angle $DAB = 80°$.

A straight path from B to D has a length of 30 metres.

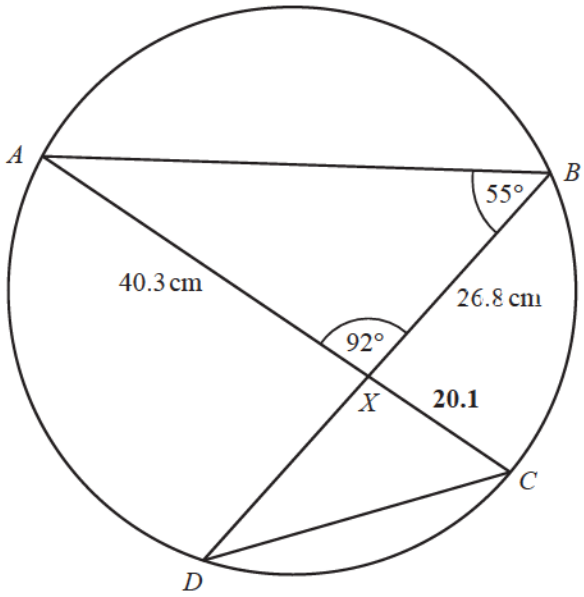
Use trigonometry, showing all your working, to calculate

(i) angle ADB, [3]

(ii) the length of BC, [4]

(iii) the area of the garden. [3]

(a)



NOT TO SCALE

A, B, C and D lie on a circle.

AC and BD intersect at X.

Angle $ABX = 55°$ and angle $AXB = 92°$.

$BX = 26.8$ cm, $AX = 40.3$ cm and $XC = 20.1$ cm.

(i) Calculate the area of triangle AXB.
You must show your working. [2]

(ii) Calculate the length of AB.
You must show your working. [3]

(iii) Write down the size of angle ACD. Give a reason for your answer. [2]

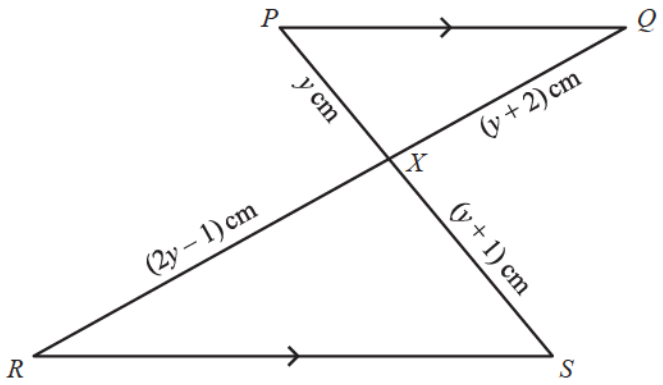
(iv) Find the size of angle BDC. [1]

(v) Write down the geometrical word which completes the statement

"Triangle AXB is ——— to triangle DXC." [1]

(vi) Calculate the length of XD.
You must show your working. [2]

(b)



NOT TO SCALE

In the diagram PQ is parallel to RS.

PS and QR intersect at X.

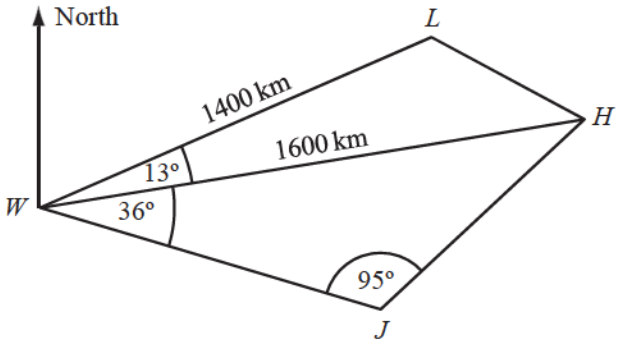
$PX = y$ cm, $QX = (y + 2)$ cm, $RX = (2y – 1)$ cm and $SX = (y + 1)$ cm.

(i) Show that $y^2 – 4y – 2 = 0$. [3]

(ii) Solve the equation $y^2 – 4y – 2 = 0$.

Show all your working and give your answers correct to two decimal places. [4]

(iii) Write down the length of RX. [1]



NOT TO SCALE

The diagram shows the positions of four cities in Africa, Windhoek (W), Johannesburg (J), Harari (H) and Lusaka (L).
$WL = 1400$ km and $WH = 1600$ km.
Angle $LWH = 13°$, angle $HWJ = 36°$ and angle $WJH = 95°$.

(a) Calculate the distance LH. [4]

(b) Calculate the distance WJ. [4]

(c) Calculate the area of quadrilateral $WJHL$. [3]

(d) The bearing of Lusaka from Windhoek is 060°.
Calculate the bearing of

(i) Harari from Windhoek, [1]

(ii) Windhoek from Johannesburg. [1]

(e) On a map the distance between Windhoek and Harari is 8 cm.
Calculate the scale of the map in the form $1:n$. [2]

8

Trigonometry
Difficulty: Hard

Question Paper 5

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Trigonometry
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 5

Time allowed: **84 minutes**

Score: **/73**

Percentage: **/100**

Grade Boundaries:

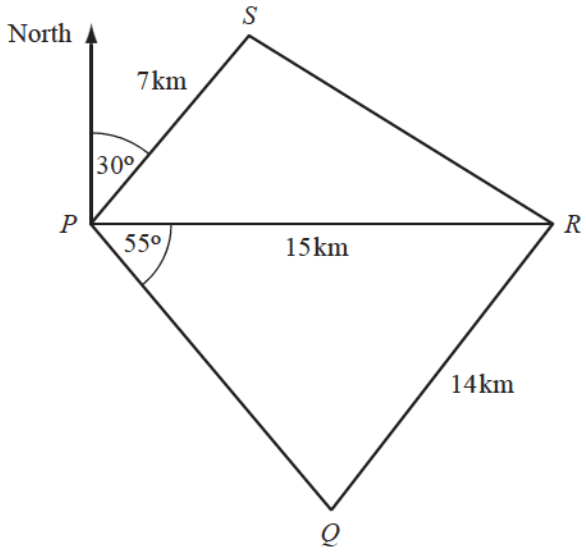
CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

NOT TO SCALE



The quadrilateral $PQRS$ shows the boundary of a forest.
A straight 15 kilometre road goes due East from P to R.

(a) The bearing of S from P is 030° and $PS = 7$ km.

(i) Write down the size of angle SPR. [1]

(ii) Calculate the length of RS. [4]

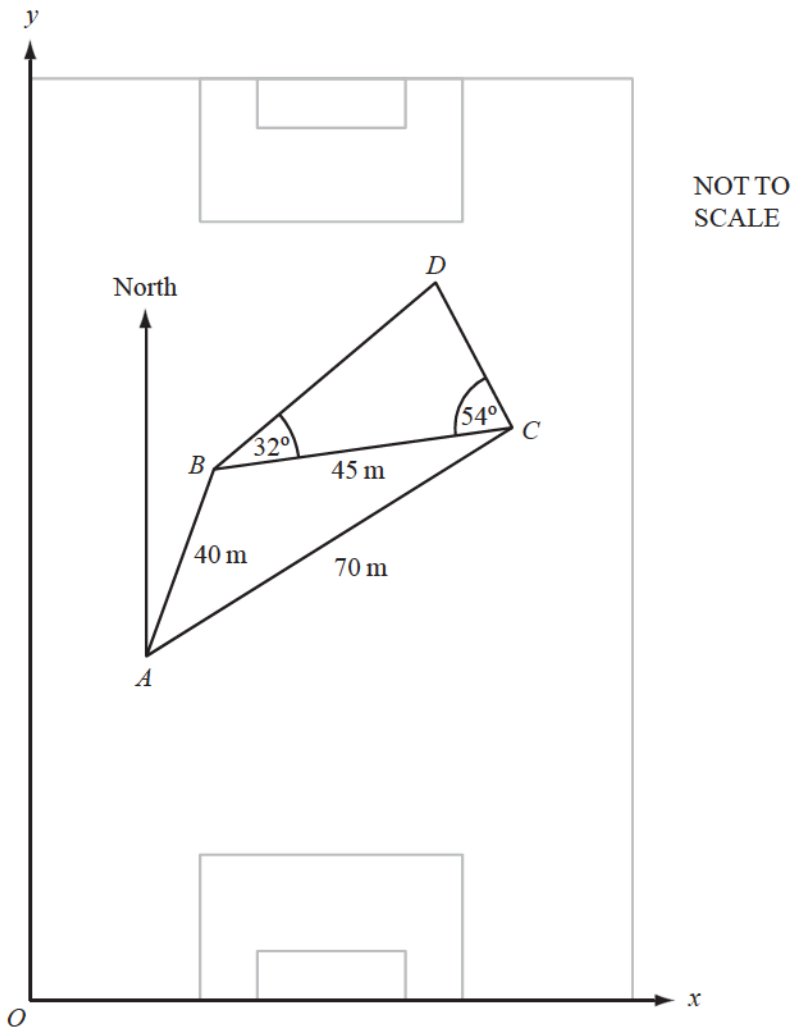
(b) Angle $RPQ = 55°$ and $QR = 14$ km.

(i) Write down the bearing of Q from P. [1]

(ii) Calculate the acute angle PQR. [3]

(iii) Calculate the length of PQ. [3]

(c) Calculate the area of the forest, correct to the nearest square kilometre. [4]



(a) During a soccer match a player runs from A to B and then from B to C as shown in the diagram.
$AB = 40$ m, $BC = 45$ m and $AC = 70$ m.

(i) Show by calculation that angle $BAC = 37°$, correct to the nearest degree. [3]

(ii) The bearing of C from A is 051°. Find the bearing of B from A. [1]

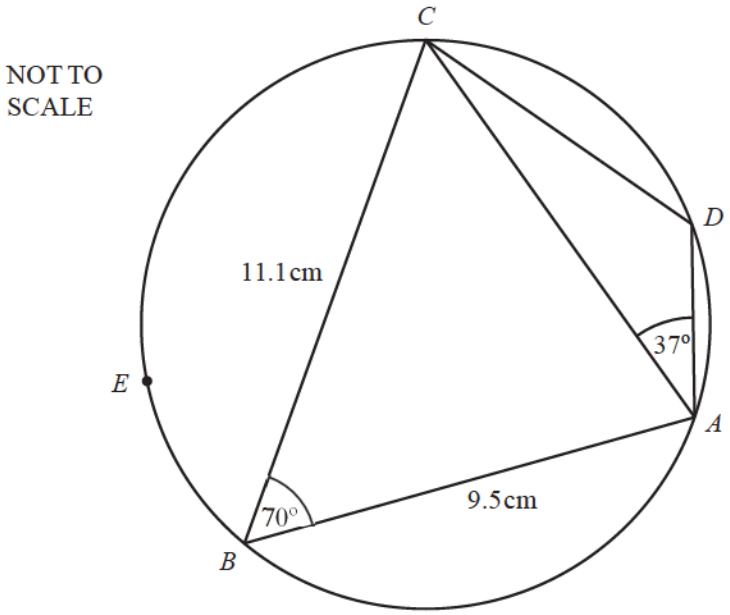
(iii) Calculate the area of triangle ABC. [3]

(b) x- and y-axes are shown in the diagram.
$\overrightarrow{AC} = \begin{pmatrix} p \\ q \end{pmatrix}$, where p and q are measured in metres.

(i) Show that $p = 54.4$. [2]

(ii) Find the value of q. [2]

(c) Another player is standing at D.
$BC = 45$ m, angle $BCD = 54°$ and angle $DBC = 32°$.
Calculate the length of BD. [4]



$ABCD$ is a cyclic quadrilateral.
$AB = 9.5$ cm, $BC = 11.1$ cm, angle $ABC = 70°$ and angle $CAD = 37°$.

(a) Calculate the length of AC. [4]

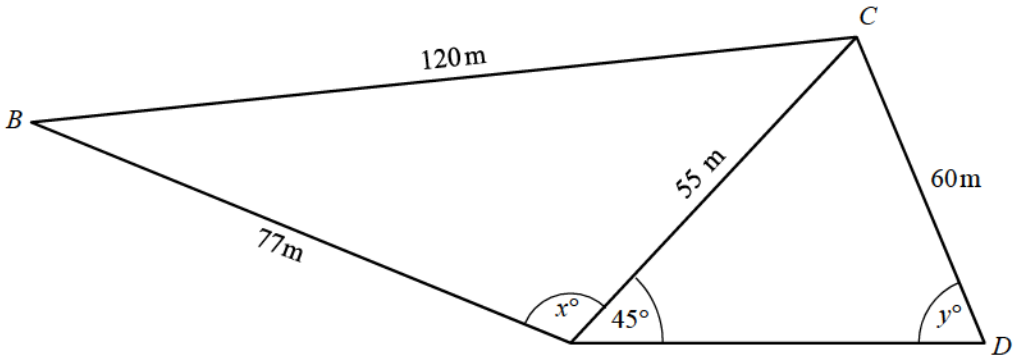
(b) Explain why angle $ADC = 110°$. [1]

(c) Calculate the length of AD. [4]

(d) A point E lies on the circle such that triangle ACE is isosceles, with $EA = EC$. [1]

(i) Write down the size of angle AEC.

(ii) Calculate the area of triangle ACE. [3]



NOT TO SCALE

In quadrilateral $ABCD$, $AB = 77$ m, $BC = 120$ m, $CD = 60$ m and diagonal $AC = 55$ m.
Angle $CAD = 45°$, angle $BAC = x°$ and angle $ADC = y°$.

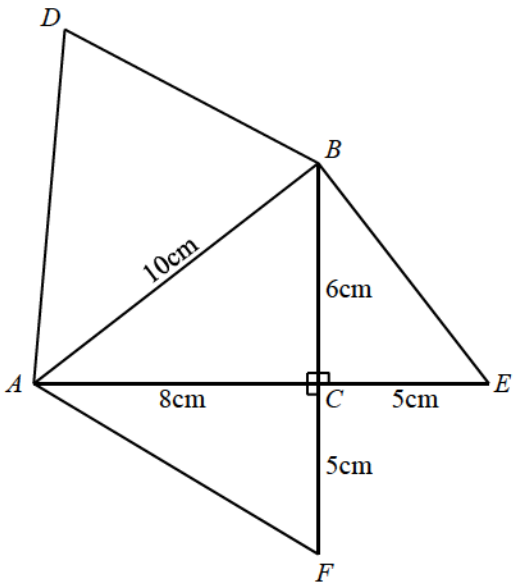
(a) Calculate the value of x. [4]

(b) Calculate the value of y. [4]

(c) The bearing of D from A is 090°.
Find the bearing of

(i) A from C, [2]

(ii) B from A. [2]



NOT TO SCALE

The diagram shows a sketch of the net of a solid tetrahedron (triangular prism).
The right-angled triangle ABC is its base.
$AC = 8$ cm, $BC = 6$ cm and $AB = 10$ cm. $FC = CE = 5$ cm.

(a) **(i)** Show that $BE = \sqrt{61}$ cm. [1]

(ii) Write down the length of DB. [1]

(iii) Explain why $DA = \sqrt{89}$ cm. [2]

(b) **Calculate** the size of angle DBA. [4]

(c) Calculate the area of triangle DBA. [3]

(d) Find the total surface area of the solid. [3]

(e) Calculate the volume of the solid.
[The volume of a tetrahedron is $\frac{1}{3}$ (area of the base) × perpendicular height.] [3]