8

(a) Construct triangle ABC accurately, with $AC = 10$ cm and $BC = 8$ cm.
The line AB has been drawn for you. [2]

(b) (i) Using a straight edge and compasses only, construct the bisector of angle A. [2]

(ii) The bisector of angle A meets BC at X.

Measure the length of BX.

Answer(b)(ii) $BX =$ ..... cm [1]

(c) (i) Using a straight edge and compasses only, construct the perpendicular bisector of AB. [2]

(ii) The perpendicular bisector of AB meets AC at Y and AX at Z.

Measure angle CYZ.

Answer(c)(ii) Angle $CYZ =$ ..... [1]

(d) Shade the region inside triangle ABC which is

- nearer to AB than to AC

and

- nearer to B than to A. [1]

9 On the scale drawing opposite, point A is a port.
B and C are two buoys in the sea and L is a lighthouse.

The scale is 1 cm = 3 km.

(a) A boat leaves port A and follows a straight line course that bisects angle BAC.

Using a straight edge and compasses only, construct the bisector of angle BAC on the scale drawing. [2]

(b) When the boat reaches a point that is equidistant from B and from C, it changes course.
It then follows a course that is equidistant from B and from C.

(i) Using a straight edge and compasses only, construct the locus of points that are equidistant from B and from C.
Mark the point P where the boat changes course. [2]

(ii) Measure the distance AP in centimetres.

Answer(b)(ii) ..... cm [1]

(iii) Work out the actual distance AP.

Answer(b)(iii) ..... km [1]

(iv) Measure the **obtuse** angle between the directions of the two courses.

Answer(b)(iv) ..... [1]

(c) Boats must be more than 9 kilometres from the lighthouse, L.

(i) Construct the locus of points that are 9 kilometres from L. [2]

(ii) Mark the point R where the course of the boat meets this locus.
Work out the actual straight line distance, AR, in kilometres.

Answer(c)(ii) ..... km [1]

6 (a)

The line AB is drawn above.

Parts (i), (iii), and (v) must be completed using a ruler and compasses only.
All construction arcs must be clearly shown.

(i) Construct triangle ABC with $AC = 7$ cm and $BC = 6$ cm. [2]

(ii) Measure angle BAC.

Answer(a)(ii) Angle BAC = ... [1]

(iii) Construct the bisector of angle ABC. [2]

(iv) The bisector of angle ABC meets AC at T.

Measure the length of AT.

Answer(a)(iv) AT = ... cm [1]

(v) Construct the perpendicular bisector of the line BC. [2]

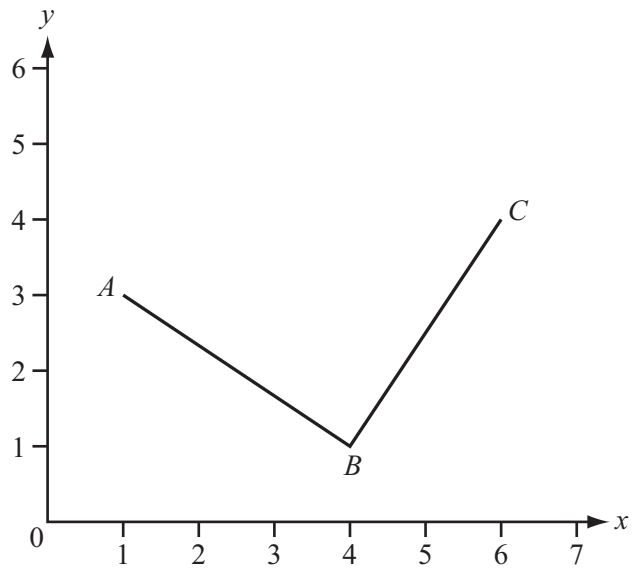
(vi) Shade the region that is

- nearer to B than to C

and

- nearer to BC than to AB. [1]

19



$A(1, 3)$, $B(4, 1)$ and $C(6, 4)$ are shown on the diagram.

(a) **Using a straight edge and compasses only,** construct the angle bisector of angle ABC. [2]

(b) Work out the equation of the line BC.

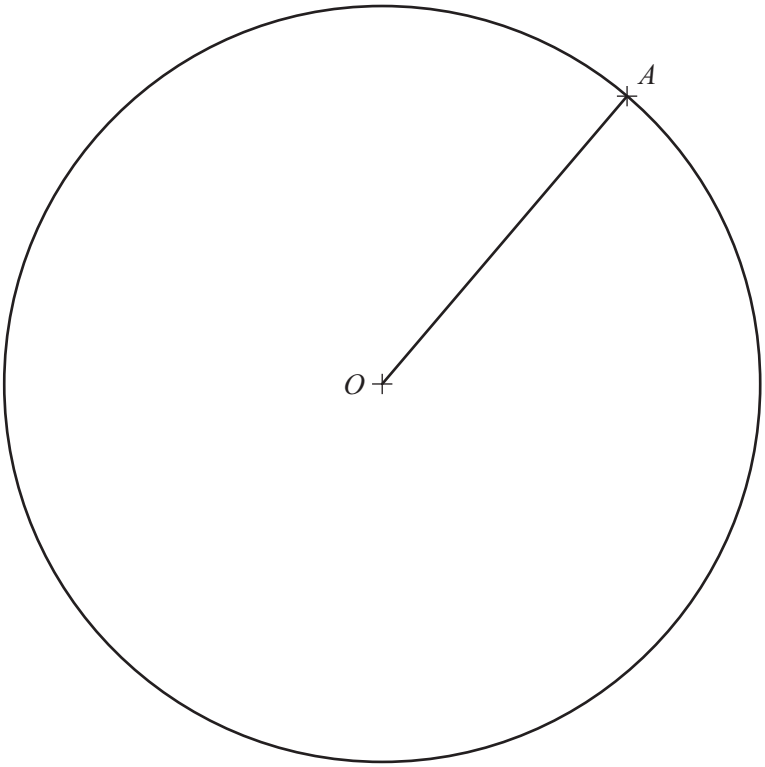
Answer(b) ..... [3]

(c) ABC forms a **right-angled isosceles** triangle of area 6.5 cm^2.

Calculate the length of AB.

Answer(c) AB = ... cm [2]

9



The point A lies on the circle centre O, radius 5 cm.

(a) Using a straight edge and compasses only, construct the perpendicular bisector of the line OA. [2]

(b) The perpendicular bisector meets the circle at the points C and D.

Measure and write down the size of the angle AOD.

Answer(b) Angle AOD = ... [1]

6 (a)

The line AB is drawn above.

Parts (i), (iii), and (v) must be completed using a ruler and compasses only.
All construction arcs must be clearly shown.

(i) Construct triangle ABC with $AC = 7$ cm and $BC = 6$ cm. [2]

(ii) Measure angle BAC.

Answer(a)(ii) Angle BAC = ... [1]

(iii) Construct the bisector of angle ABC. [2]

(iv) The bisector of angle ABC meets AC at T.

Measure the length of AT.

Answer(a)(iv) AT = ... cm [1]

(v) Construct the perpendicular bisector of the line BC. [2]

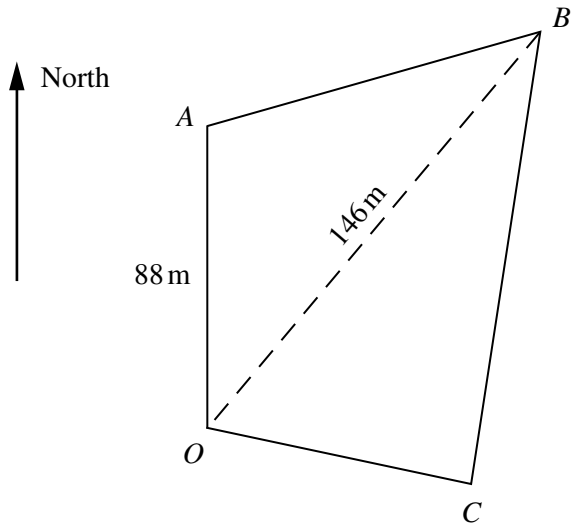
(vi) Shade the region that is

- nearer to B than to C

and

- nearer to BC than to AB. [1]

2



NOT TO SCALE

OABC is a field.
A is 88 metres due North of *O*.
B is 146 metres from *O* on a bearing of 040°.
C is equidistant from *A* and from *B*. The bearing of *C* from *O* is 098°.

(a) Using a scale of 1 centimetre to represent 10 metres, make an accurate scale drawing of the field *OABC*, by

(i) constructing the triangle *OAB*, [3]

(ii) drawing the locus of points equidistant from *A* and from *B*, [2]

(iii) completing the scale diagram of *OABC*. [2]

(b) Use your scale drawing to write down

(i) the distance *OC* correct to the nearest metre, [1]

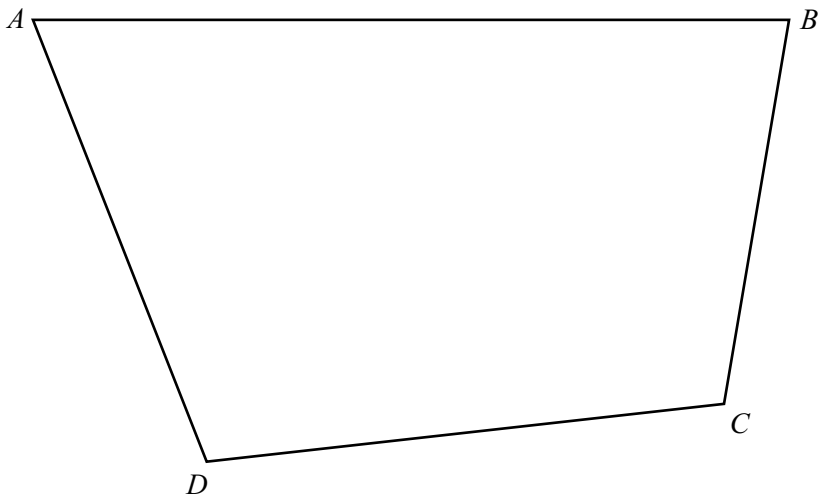
(ii) the size of angle *OAB* correct to the nearest degree. [1]

(c) Find the bearing of *A* from *B*. [2]

(d) A donkey in the field is not more than 40 metres from *C* and is closer to *B* than to *A*.
Shade the area where the donkey could be and label it *D*. [3]

(e) A horse in the field is not more than 20 metres from the side *AB* and is closer to *A* than to *B*.
Shade the area where the horse could be and label it *H*. [3]

The diagram is a scale drawing of a field. The actual length of the side AB is 100 metres.



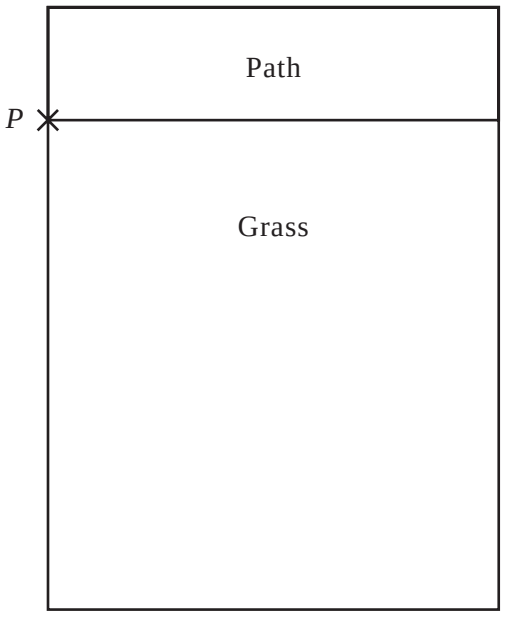
(a) Write the scale of the drawing in the form 1 : n, where n is an integer.

Answer (a) 1 : ..... [1]

(b) In this part use a straight edge and compasses only. Leave in your construction lines.

(i) A tree in the field is equidistant from the point A and the point D. Construct the line on which the tree stands. [2]

(ii) The tree is also equidistant from the sides BC and CD. After constructing another line, mark the position of the tree and label it T. [3]

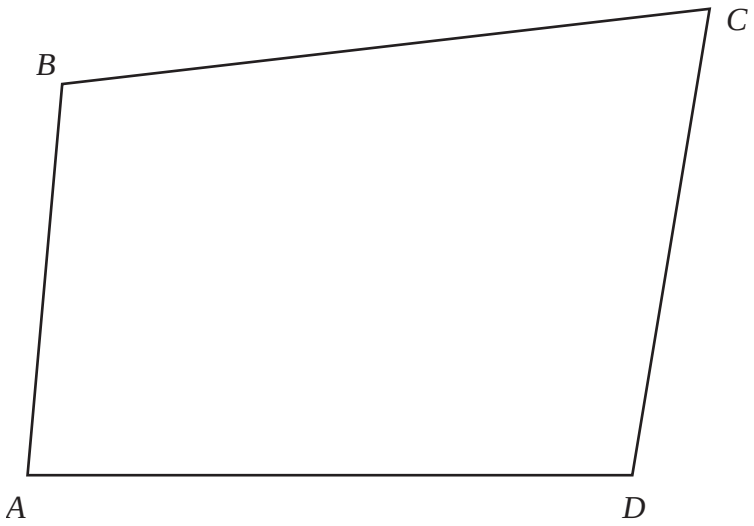


The diagram, drawn to a scale of 1 cm to 1 m, shows a garden made up of a path and some grass. A goat is attached to a post, at the point P, by a rope of length 4 m.

(a) Draw the locus of all the points in the **garden** that the goat can reach when the rope is tight. [1]

(b) Calculate the area of the **grass** that the goat can eat.

Answer(b) ..... m^2 [2]



In this question show clearly all your construction arcs.

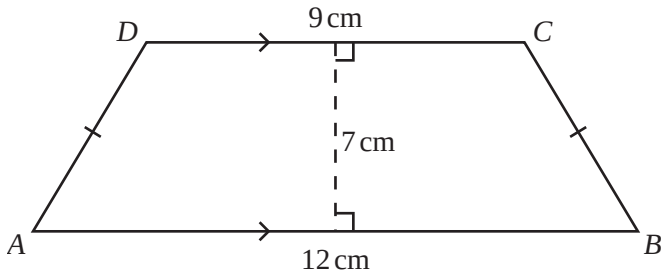
(a) Using a straight edge and compasses only, construct on the diagram above,

(i) the perpendicular bisector of BD, [2]

(ii) the bisector of angle CDA. [2]

(b) Shade the region, inside the quadrilateral, which is nearer to D than B **and** nearer to DC than DA. [1]

2 Answer the whole of this question on a new page.



NOT TO SCALE

The diagram shows a trapezium $ABCD$.
$AB = 12$ cm, $DC = 9$ cm and the perpendicular distance between these parallel sides is 7 cm.
$AD = BC$.

(a) Approximately halfway down your page, draw a line AB of length 12 cm. [1]

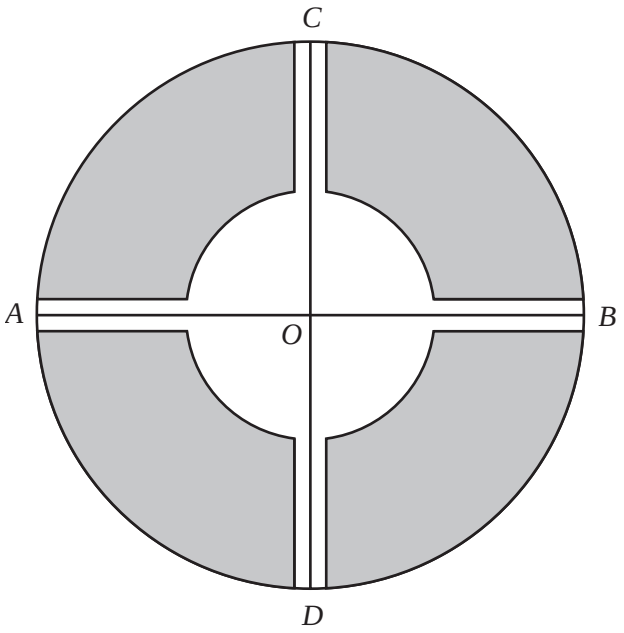
(b) Using a straight edge and compasses only, construct the perpendicular bisector of AB. [2]

(c) Complete an **accurate** drawing of the trapezium $ABCD$. [2]

(d) **Measure** angle ABC, giving your answer correct to the nearest degree. [1]

(e) Use trigonometry to calculate angle ABC.
Show all your working and give your answer correct to 1 decimal place. [2]

(f) On your diagram,
(i) draw the locus of points inside the trapezium which are 5 cm from D, [1]
(ii) using a straight edge and compasses only, construct the locus of points equidistant from DA and from DC, [2]
(iii) shade the region inside the trapezium containing points which are less than 5 cm from D **and** nearer to DA than to DC. [1]



The diagram shows a plan for a new city.
It is to be built inside a circle of radius 5 km.
The areas where homes can be built are shaded on the diagram.
The homes must be at least 2 km from the centre of the city, *O*.
The homes must also be at least 0.5 km from two main roads *CD* and *AB*, which are in North-South and West-East directions.

(a) Using 1 cm to represent 1 km, make an **accurate** scale drawing showing the areas for the homes.
(You do not need to shade these areas.) [4]

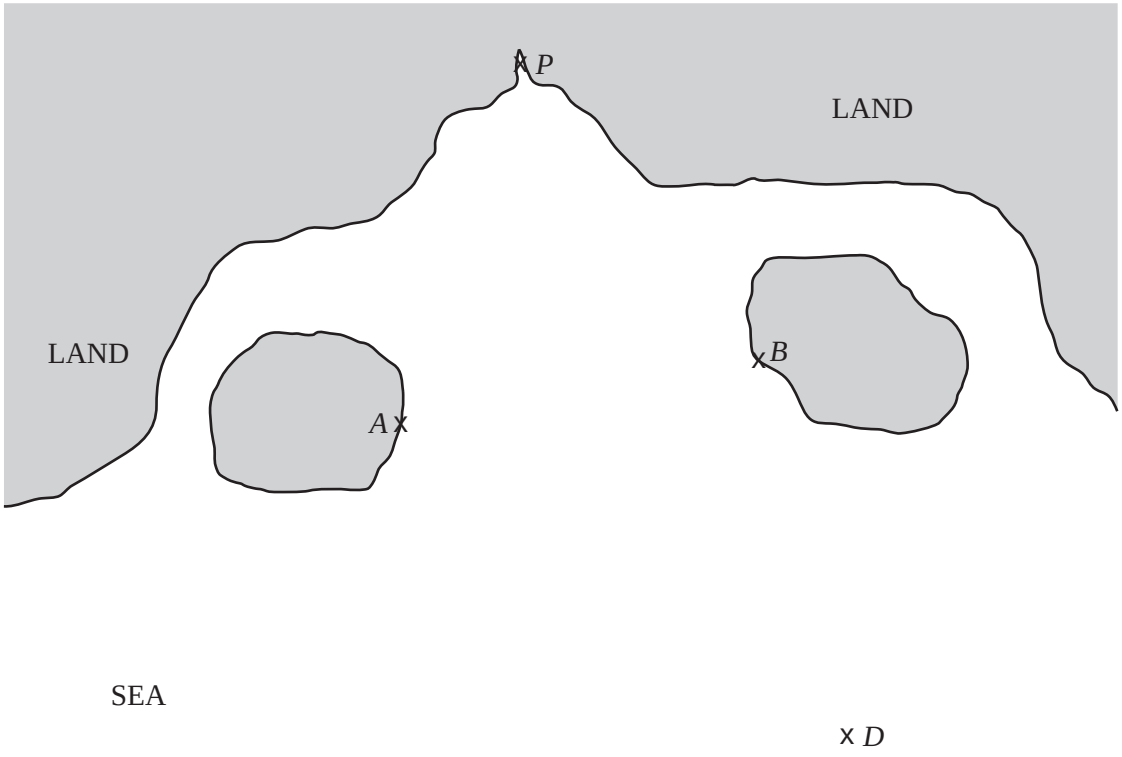
(b) The town hall, *T*, will be built so that it is equidistant from the roads *OA* and *OC*.
It will be 1 km from *O* **and** West of *CD*.

(i) On your scale drawing, using a straight edge and compasses only, draw the locus of points, inside the town, which are equidistant from *OA* and *OC*. [2]

(ii) Mark and **label** the point *T*. [1]

(c) The police station, *P*, will be built so that it is equidistant from *T* and *B*.
It will be 3 km from *O* **and** North of *AB*.
Showing all your construction lines, find and **label** the point *P*. [3]

(d) What will be the actual straight line distance between the town hall and the police station? [1]



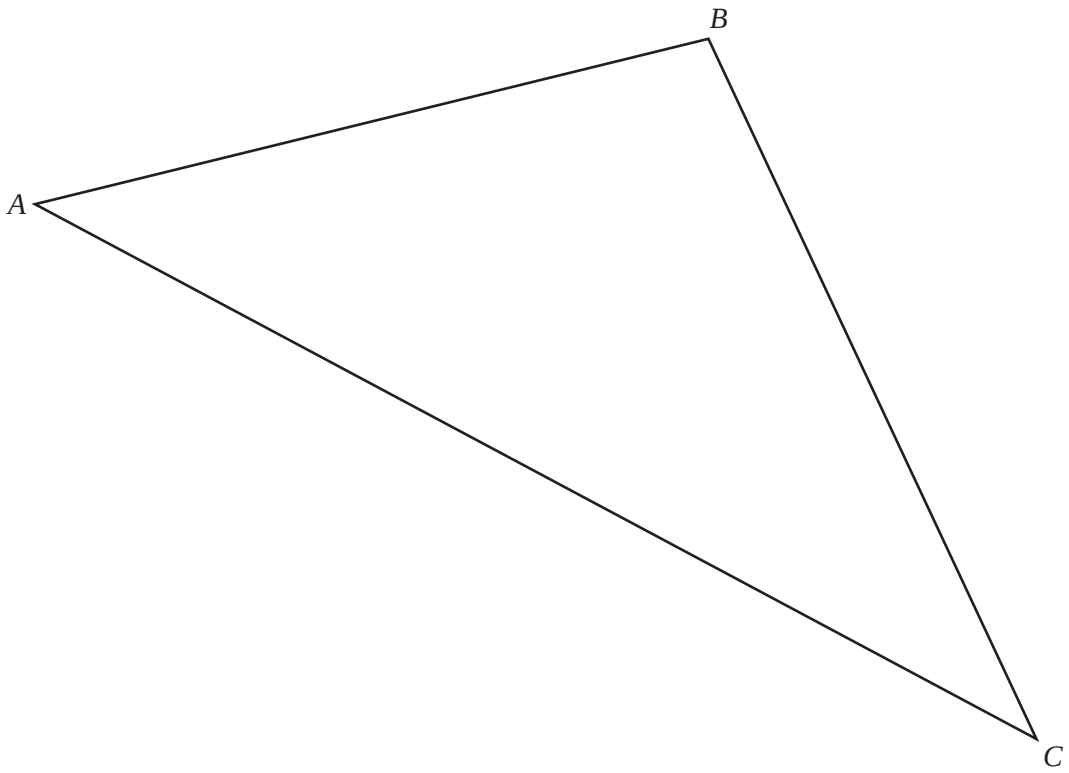
The diagram shows a map of part of a coastline.
1 centimetre represents 40 metres.

(a) A ferry leaves a port *P* and travels between two islands so that it is always equidistant from *A* and *B*.
Using a straight edge and compasses only, draw this locus. [2]

(b) For safety reasons the ferry must be at least 120 metres from a ship at *D*.
Draw the locus of the points which form the boundary of safety around *D*. [1]

(c) When the ferry is 120 metres from *D* it must change direction.
How far is the ferry from the port *P* then?

Answer(c) ..... m [1]



The diagram shows a farmer's field *ABC*.

The farmer decides to grow potatoes in the region of the field which is

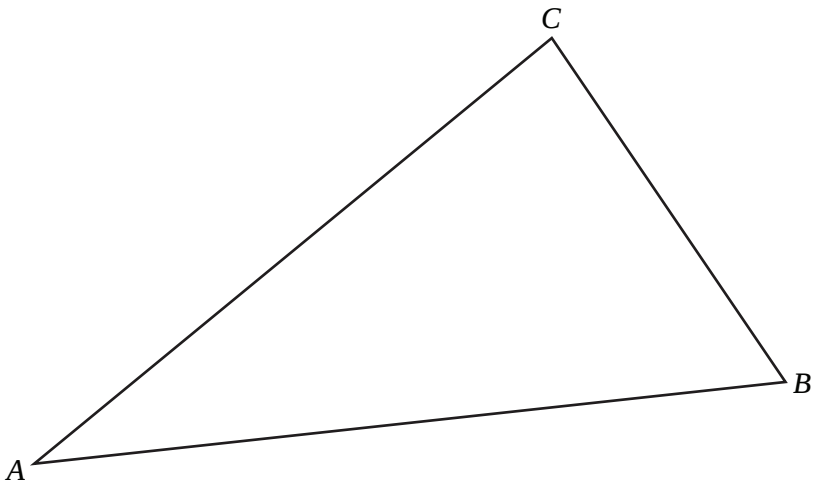
- nearer to *A* than to *C*

and

- nearer to *AB* than to *AC*.

Using **a straight edge and compasses only**, construct two loci accurately and shade this region on the diagram.

[5]



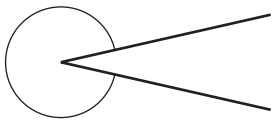
(a) On the diagram above, **using a straight edge and compasses only**, construct

(i) the bisector of angle ABC, [2]

(ii) the locus of points which are equidistant from A and from B. [2]

(b) Shade the region inside the triangle which is nearer to A than to B **and** nearer to AB than to BC. [1]

17 (a)



What type of angle is shown by the arc on the diagram?

Answer(a) ..... [1]

(b) *ABCD* is a quadrilateral.

- *AB* is parallel to *DC*.
- *BC* is longer than *AD*.

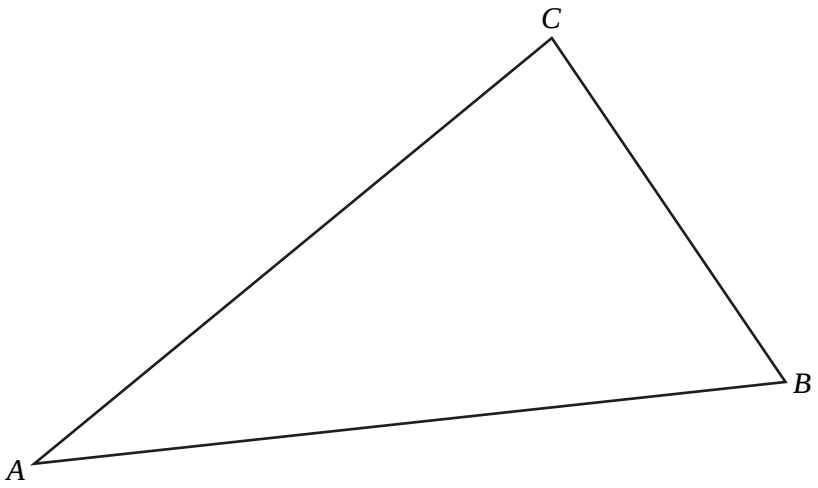
(i) Draw a possible quadrilateral *ABCD*.

Answer(b)(i)

[1]

(ii) Write down the geometrical name for the quadrilateral *ABCD*.

Answer(b)(ii) ..... [1]



(a) On the diagram above, **using a straight edge and compasses only**, construct

(i) the bisector of angle ABC, [2]

(ii) the locus of points which are equidistant from A and from B. [2]

(b) Shade the region inside the triangle which is nearer to A than to B **and** nearer to AB than to BC. [1]

9 **(a)** In the space below, construct the triangle ABC with $AB = 10$ cm and $AC = 12$ cm.
Leave in your construction arcs.
The line BC is already drawn.

B ——————————————————— C

[2]

(b) Measure angle ABC.

Answer(b) Angle ABC = ... [1]

(c) **(i)** **Using a straight edge and compasses only**, and leaving in your construction arcs, construct the perpendicular bisector of BC. [2]

(ii) This bisector cuts AC at P.

Mark the position of P on the diagram and measure AP.

Answer(c)(ii) AP = ... cm [1]

(d) Construct the locus of all the points inside the triangle which are 5 cm from A. [1]

(e) Shade the region inside the triangle which is

- nearer to B than to C

and

- less than 5 cm from A. [2]

2

(a) In the space above, construct triangle PQR with $QR = 9$ cm and $PR = 7$ cm.
Leave in your construction arcs.
The line PQ is already drawn. [2]

(b) **Using a straight edge and compasses only**, construct

(i) the perpendicular bisector of PR, [2]

(ii) the bisector of angle QPR. [2]

(c) Shade the region inside the triangle PQR which is

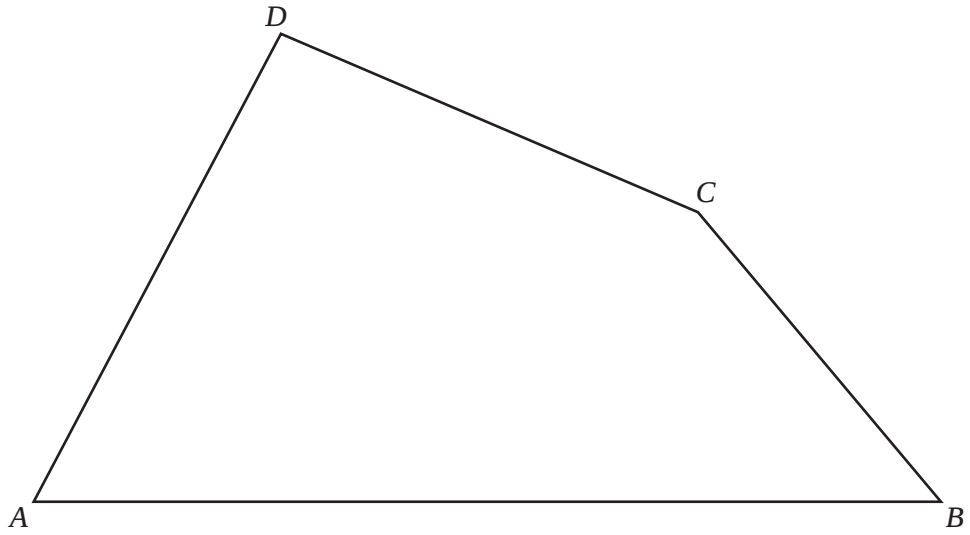
nearer to P than to R **and** nearer to PQ than to PR. [1]

(d) Triangle PQR is a scale drawing with a scale 1 : 50 000.

Find the **actual** distance QR.
Give your answer in kilometres.

Answer(d) ..... km [2]

8



(a) Draw accurately the locus of points, inside the quadrilateral *ABCD*, which are 6 cm from the point *D*. [1]

(b) **Using a straight edge and compasses only,** construct

(i) the perpendicular bisector of *AB*, [2]

(ii) the locus of points, inside the quadrilateral, which are equidistant from *AB* and from *BC*. [2]

(c) The point *Q* is equidistant from *A* and from *B* **and** equidistant from *AB* and from *BC*.

(i) Label the point *Q* on the diagram. [1]

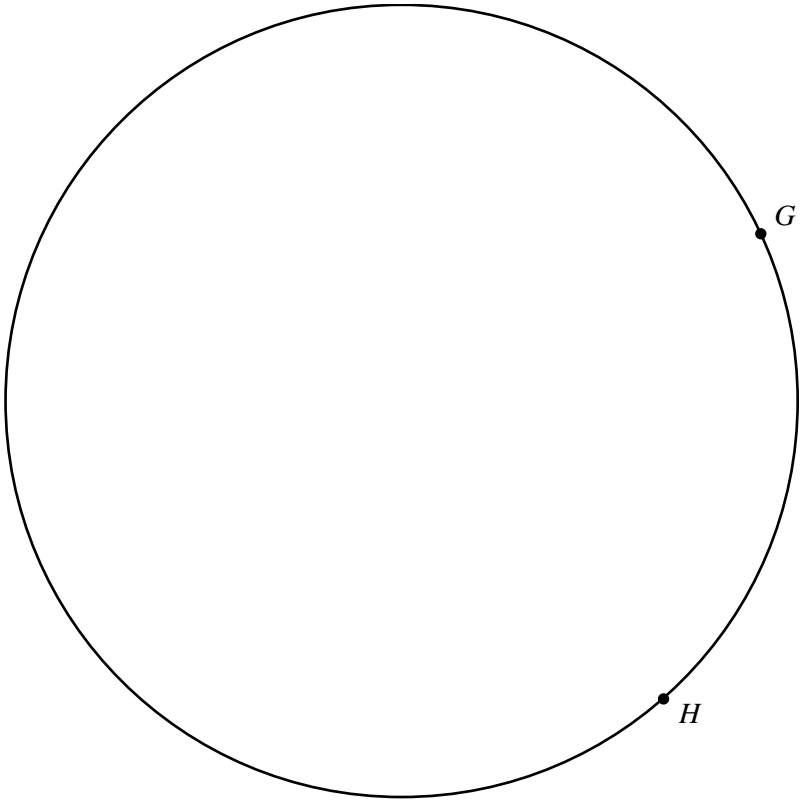
(ii) Measure the distance of *Q* from the line *AB*.

Answer(c)(ii) ..... cm [1]

(d) On the diagram, shade the region inside the quadrilateral which is

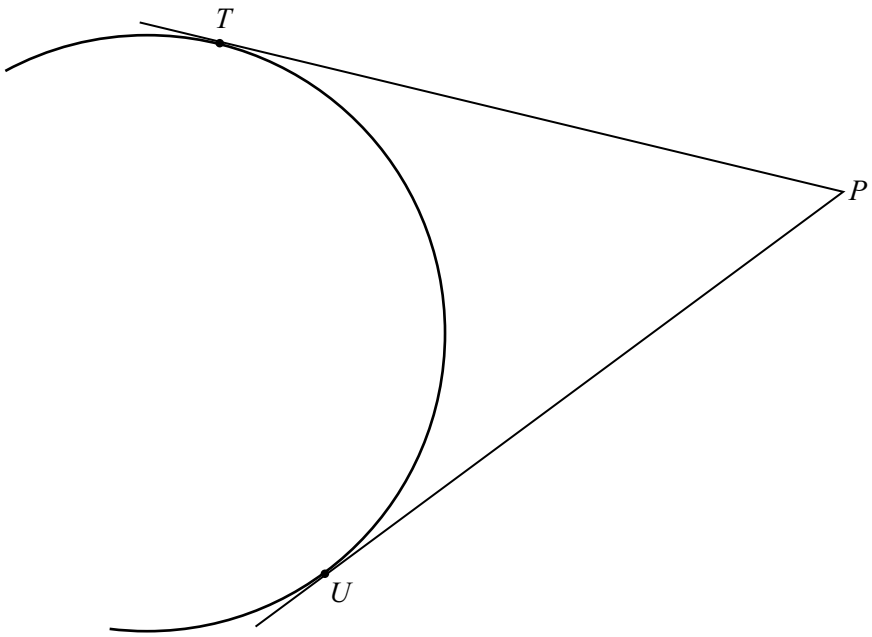
- less than 6 cm from *D*
  and
- nearer to *A* than to *B*
  and
- nearer to *AB* than to *BC*. [1]

18



Find, by using **accurate** constructions, the region inside the circle which contains the points more than 5 cm from G **and** nearer to H than to G. Shade this region. [4]

15

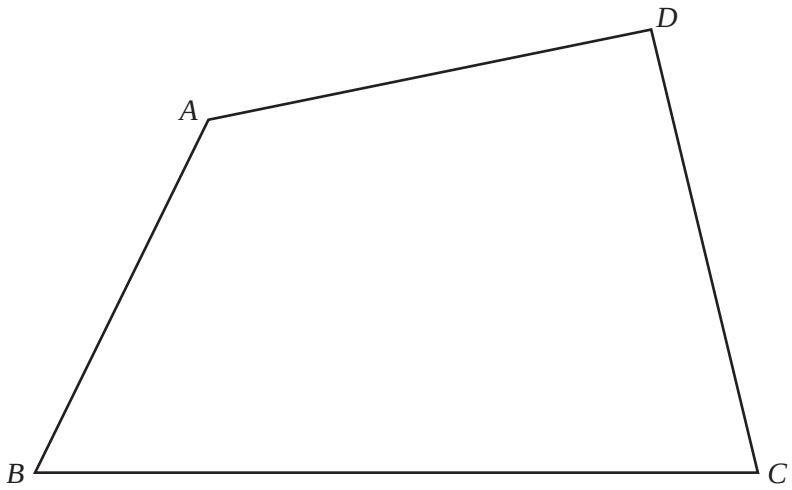


PT and *PU* are tangents to an arc of a circle at *T* and *U*.

(a) Using a straight edge and compasses only, construct the bisector of angle *TPU*. [2]

(b) By **drawing another line accurately**, find the centre of the circle and label it *O*. [2]

15



The diagram shows a quadrilateral *ABCD*.

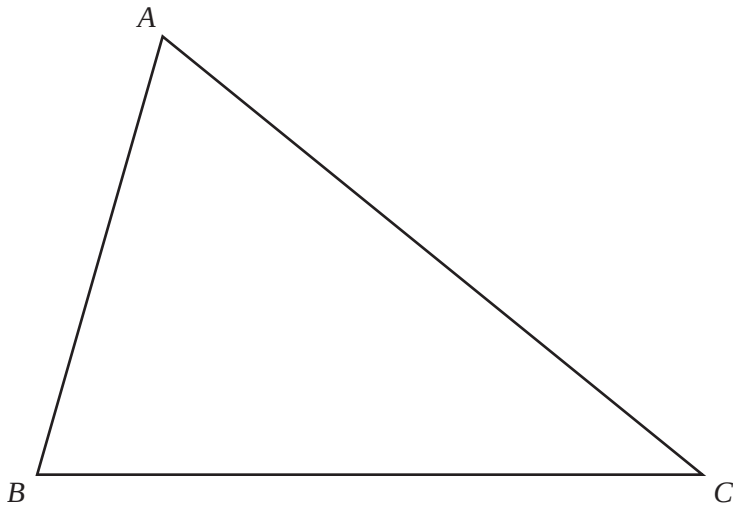
(a) Draw the locus of points in the quadrilateral which are 5 cm from *A*. [1]

(b) Using a straight edge and compasses only, draw the locus of all points inside the quadrilateral which are equidistant from *C* and *D*.
Show all your construction lines. [2]

(c) Shade the region which contains points in the quadrilateral that are more than 5 cm from *A* and nearer to *D* than to *C*.

[1]

22



(a) In this part of the question use a straight edge and compasses only.

Leaving in your construction lines,

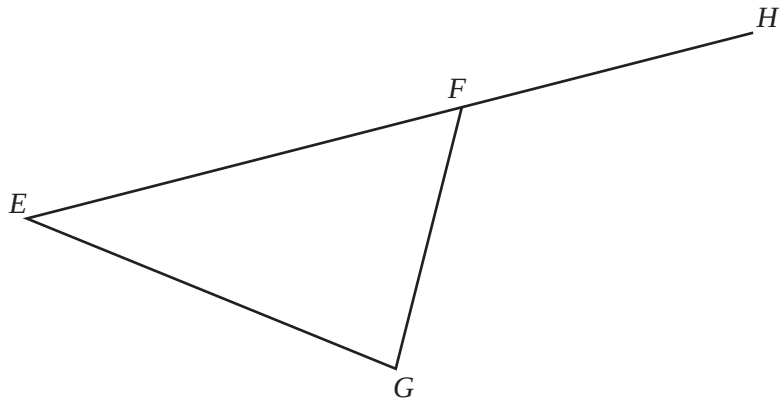
(i) construct the angle bisector of angle ACB, [2]

(ii) construct the perpendicular bisector of AC. [2]

(b) Draw the locus of all the points inside the triangle ABC which are 7 cm from C. [1]

(c) Shade the region inside the triangle which is nearer to A than C, nearer to BC than AC and less than 7 cm from C. [1]

18



The diagram shows a triangle *EFG*. The side *EF* is extended to *H*.

(a) Using a straight edge and compasses only, **showing your construction arcs**, draw

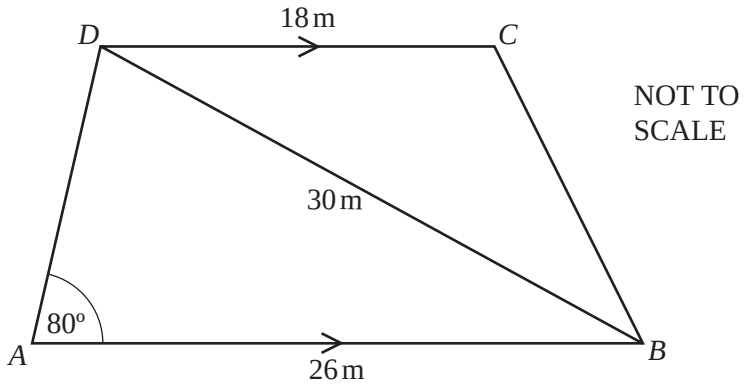
(i) the locus of points that are equidistant from *E* and *G*, [2]

(ii) the locus of points that are equidistant from *FG* and *FH*. [2]

(b) Measure accurately and write down the acute angle between the two lines drawn in **part (a)**.

Answer(b) ..... [1]

6



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.

(a) (i) Using a scale of 1 : 200, draw an **accurate** plan of the garden. [3]

(ii) **Measure** and write down the size of angle ADB and the size of angle DCB. [2]

(iii) A second path is such that all points on it are equidistant from AB and from AD.

Using a straight edge and compasses only, construct this path on your plan. [2]

(iv) A third path is such that all points on it are equidistant from A and from D.

Using a straight edge and compasses only, construct this path on your plan. [2]

(v) In the garden, vegetables are grown in the region which is nearer to AB than to AD **and** nearer to A than to D.

Shade this region on your plan. [1]

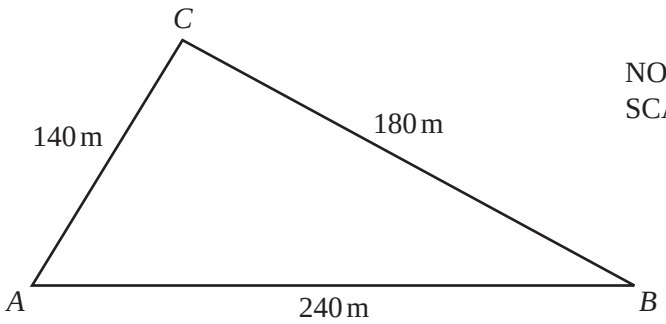
(b) **Use trigonometry**, showing all your working, to calculate

(i) angle ADB, [3]

(ii) the length of BC, [4]

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

4



The boundary of a park is in the shape of a triangle ABC.
$AB = 240$ m, $BC = 180$ m and $CA = 140$ m.

In part (a), show clearly all your construction arcs.

(a) (i) Using a scale of 1 centimetre to represent 20 metres, **construct** an **accurate** scale drawing of triangle ABC. The line AB has already been drawn for you.

[2]

(ii) Using a straight edge and compasses only, **construct** the bisector of angle ACB.

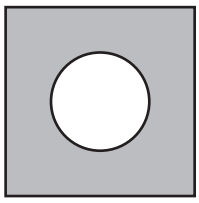
Label the point D, where this bisector meets AB. [2]

(iii) Using a straight edge and compasses only, construct the locus of points, inside the triangle, which are equidistant from A and from D. [2]

(iv) Flowers are planted in the park so that they are nearer to AC than to BC **and** nearer to D than to A.

Shade the region inside your triangle which shows where the flowers are planted. [1]

13



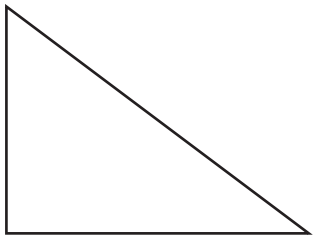
NOT TO SCALE

The diagram shows a circle of radius 5cm in a square of side 18cm.

Calculate the shaded area.

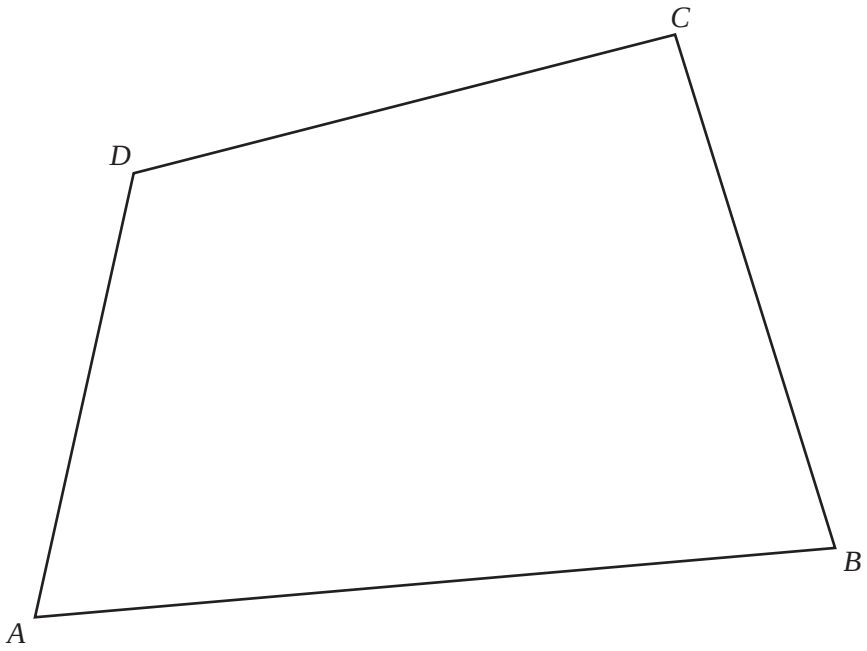
Answer ..... cm^2 [3]

14



Draw, accurately, the locus of all the points **outside** the triangle which are 3 centimetres away from the triangle. [3]

5



The diagram shows an area of land *ABCD* used for a shop, a car park and gardens.

(a) **Using a straight edge and compasses only**, construct

(i) the locus of points equidistant from *C* and from *D*, [2]

(ii) the locus of points equidistant from *AD* and from *AB*. [2]

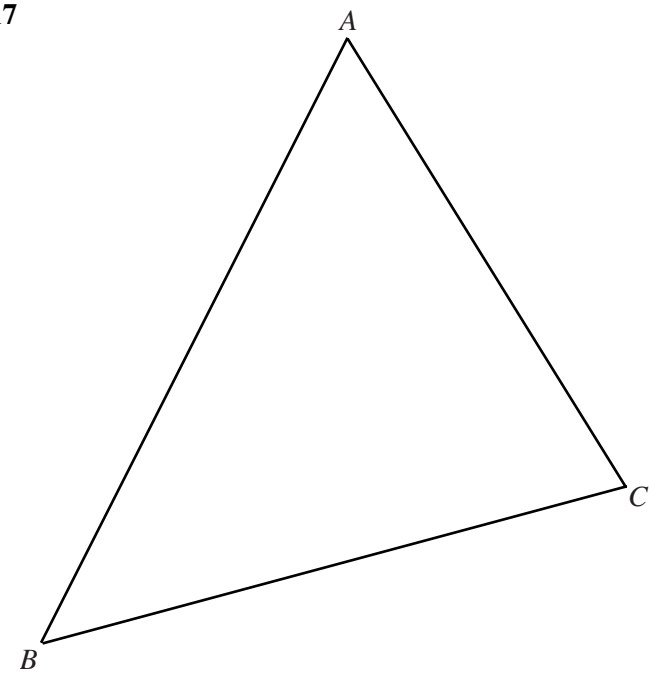
(b) The shop is on the land nearer to *D* than to *C* **and** nearer to *AD* than to *AB*.

Write the word SHOP in this region on the diagram. [1]

(c) **(i)** The scale of the diagram is 1 centimetre to 20 metres.
The gardens are the part of the land less than 100 m from *B*.
Draw the boundary for the gardens. [1]

(ii) The car park is the part of the land not used for the shop and not used for the gardens.
Shade the car park region on the diagram. [1]

17



(a) Draw accurately the locus of points inside the triangle

(i) 6 cm from B, [1]

(ii) equidistant from AC and BC. [1]

(b) Shade the region inside the triangle which is more than 6 cm from B **and** nearer to BC than to AC. [1]