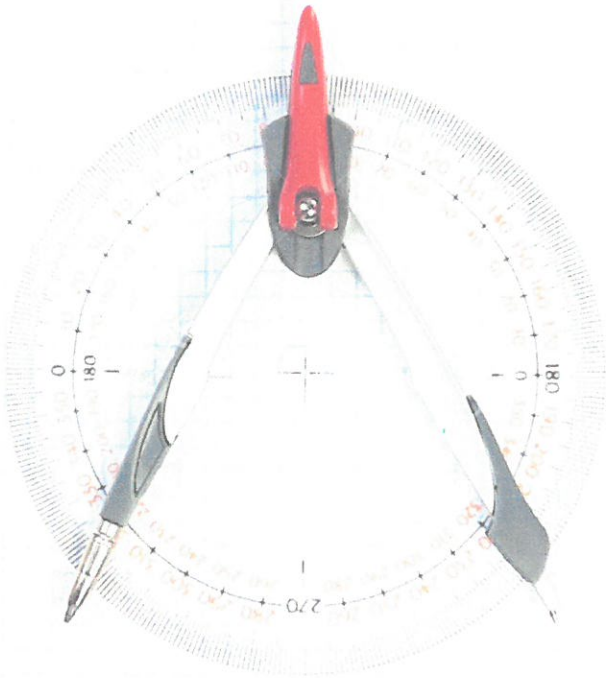
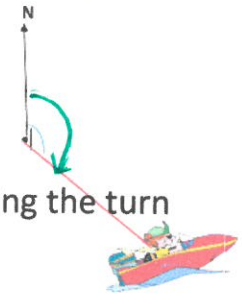
Bearings - Constructions - Loci



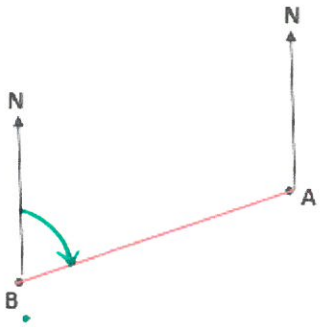
Using your measuring kit!

Three-figure Bearings

- These are used, along with distance to describe the location of an object from a point.

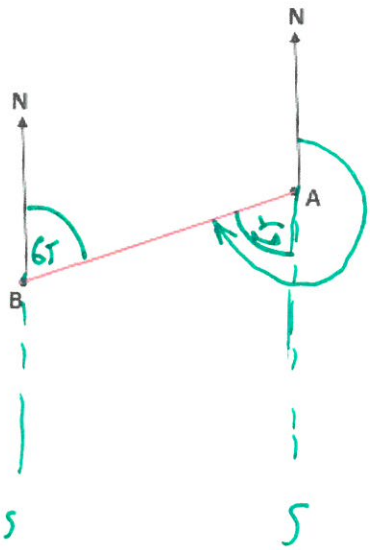


- The direction is always measured in a clockwise direction from North.
- The bearing of **A from B** means that you are standing at B and measuring the turn you make from pointing North to pointing at A.



- If the measured angle is less than 100°, a zero is placed in front to make a three digit number. So an measured angle of 65° would be a bearing of 065°.
- Because the North-South direction is always the same, the properties of parallel lines can be used to work out angles.

  For example, if the bearing of A from B is 065°, we can work out the bearing of B from A (the back-bearing) without measuring.



180 + 65 = 245°

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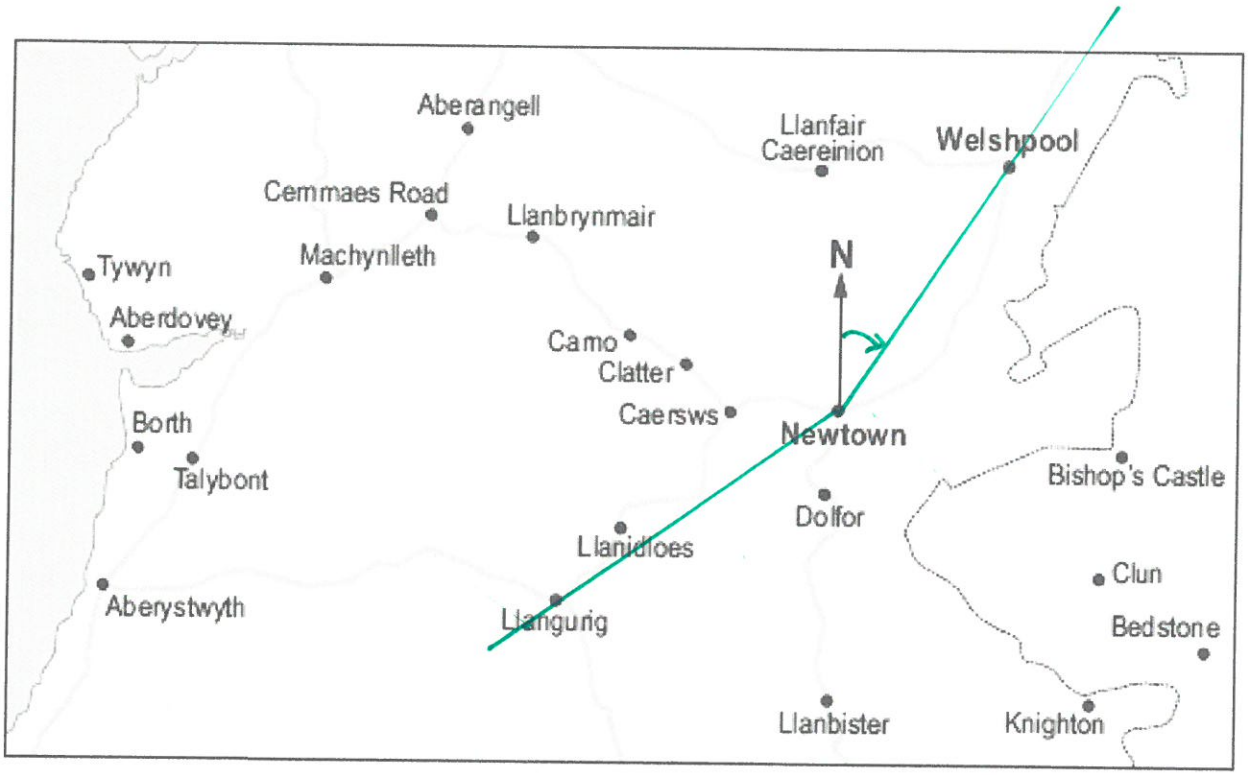
4. The map shows a part of Wales.
The position of Newtown is shown on the map.



(a) Write down the bearing of Welshpool from Newtown. [1]

035°

(b) Name the place on the map that is on a bearing of 235° from Newtown. [2]

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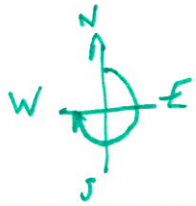
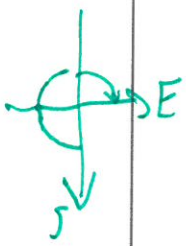


4. *(a)* How would the direction **due west** be written as a three-figure bearing?
Circle your answer. [1]

360° 180° 090° 270° 000°



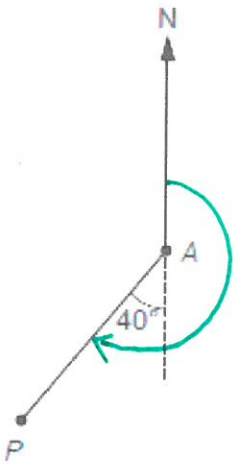
(b) There are 360° in a full turn.

A pointer facing **due south** is spun <u>clockwise</u> through $3\frac{3}{4}$ full turns.

In which direction will the pointer now face?
Circle your answer. [1]

north south west east none of these directions

(c)



What is the bearing of point *P* from point *A*?
Circle your answer. [1]

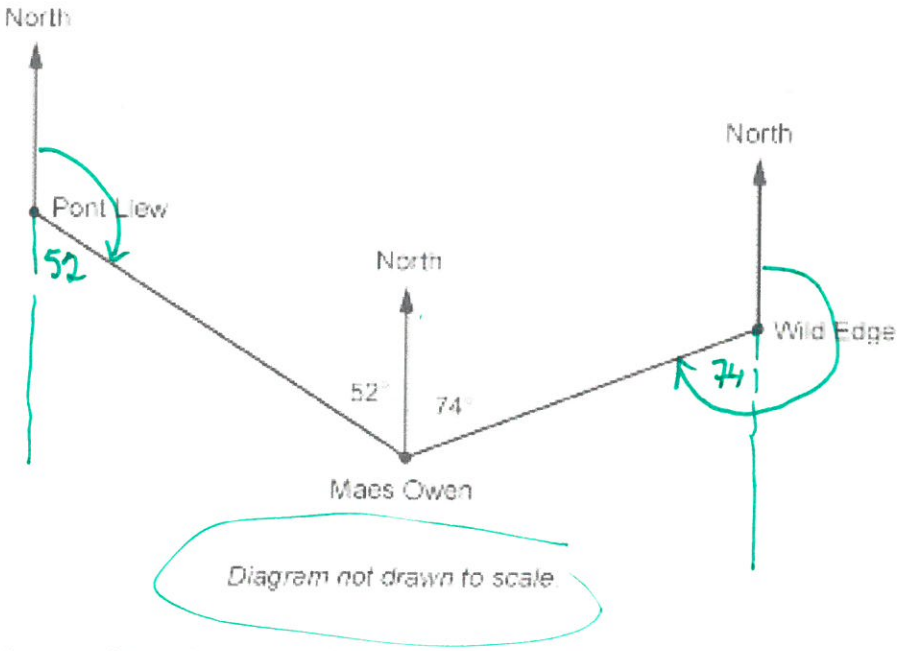
220° 040° 140° 320° 230°

(a) The picture shows a map of Italy where 1 cm represents 50 km.
Measure and find the straight line distance, in km, from Milan to Rome.
You must show your working. [2]

6 cm × 50 = 300 km

(b) A plane flies from Milan on a bearing of 110°. Radar at Rome detects the plane on a bearing of 042°. Plot the position of the plane, P. [3]

(b) A further section of the cable is to run from Pont Llew to Maes Owen and then on to Wild Edge.



The above diagram shows the section of the cable from Pont Llew to Wild Edge.
Write down the bearing of

(i) Maes Owen from Wild Edge. [2]

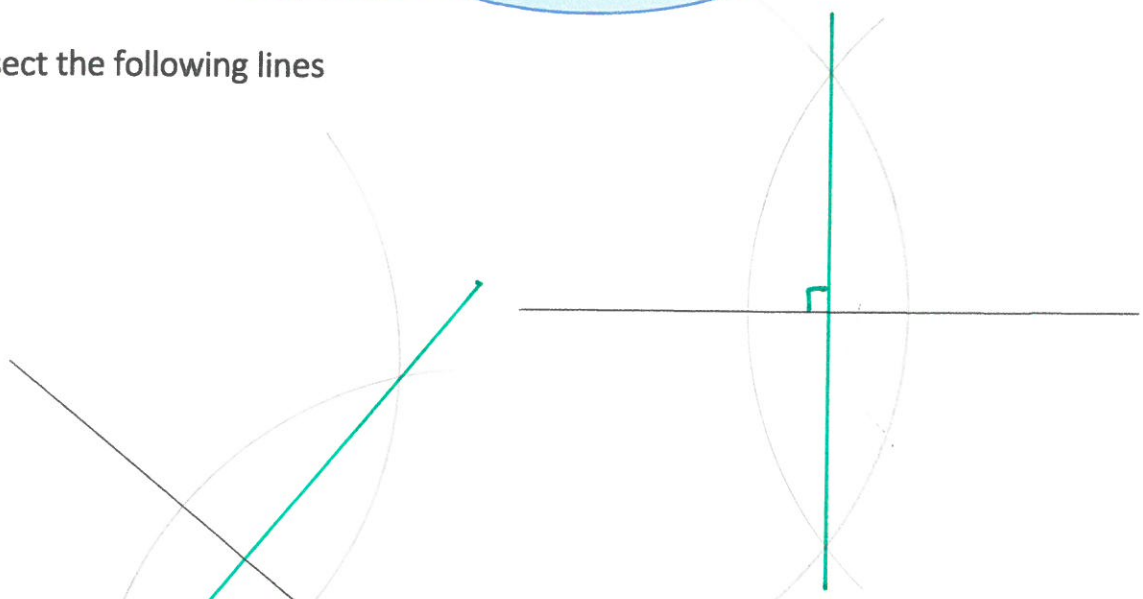
180 + 74 = 254°

(ii) Maes Owen from Pont Llew. [2]

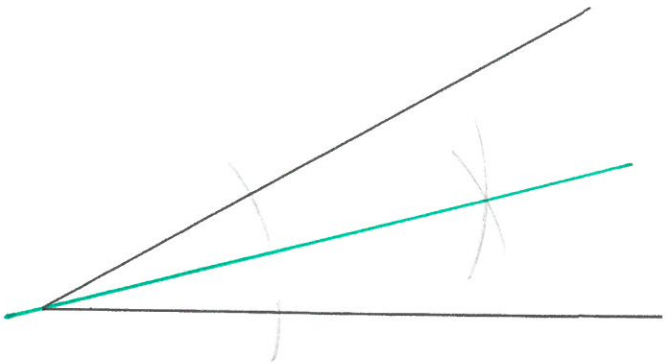
180 - 52 = 128°

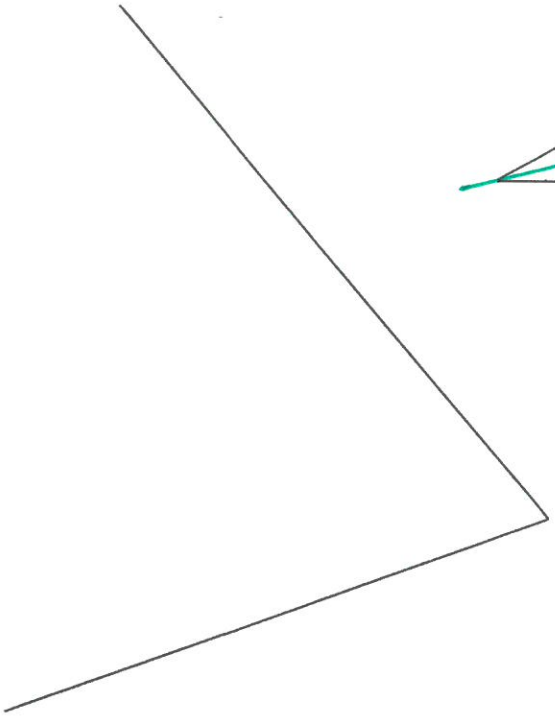
Accurate Drawing

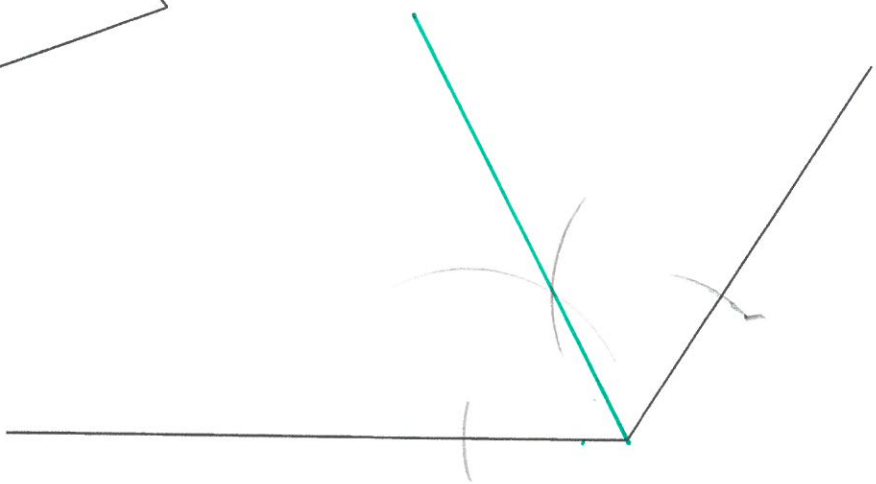
Bisect the following lines

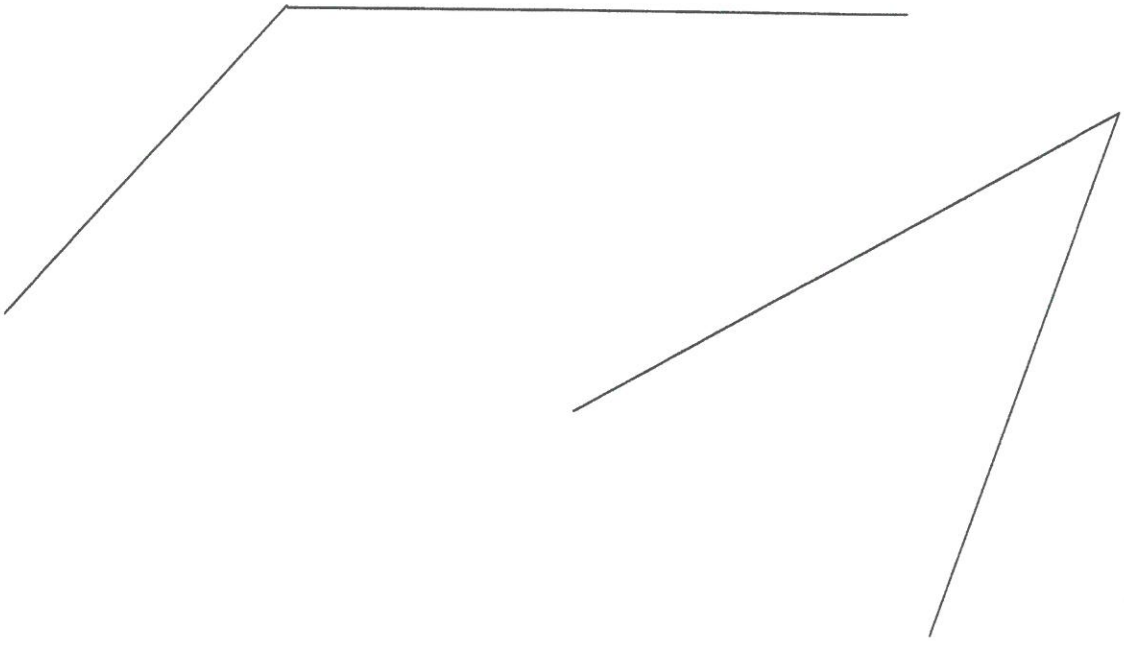


Bisect the following angles

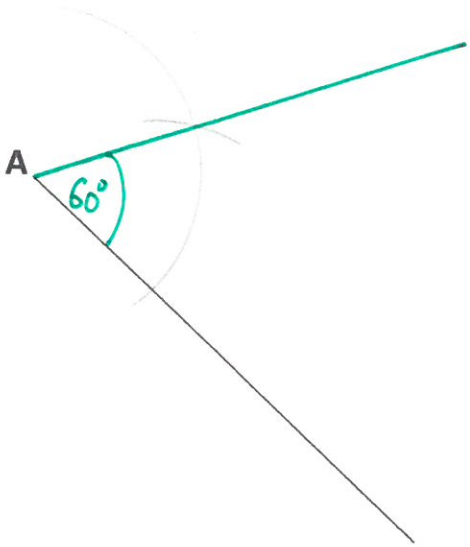


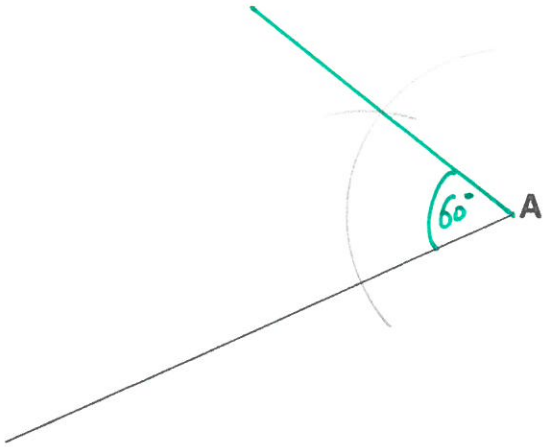




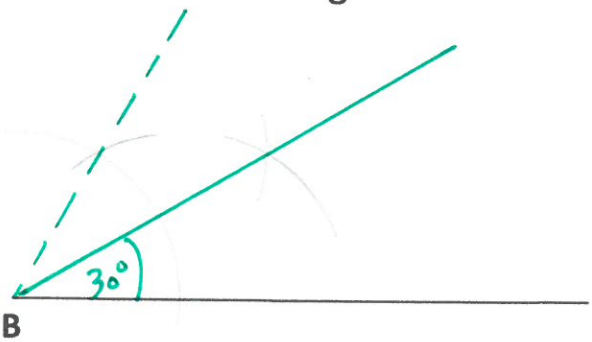


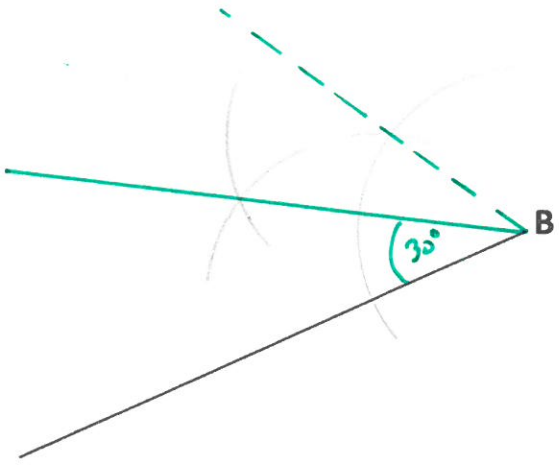
Construct a 60° angle at A



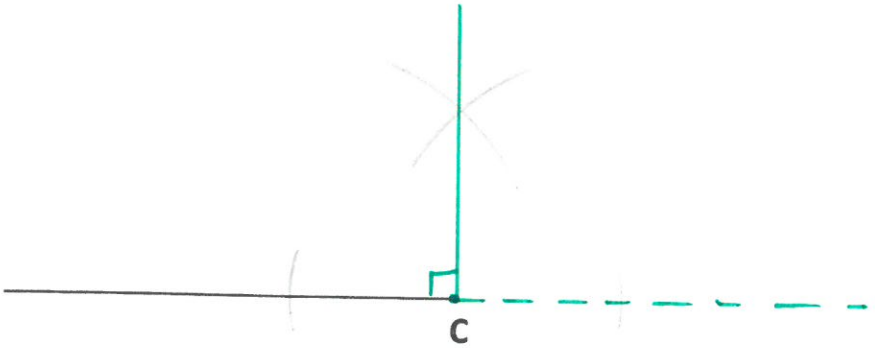


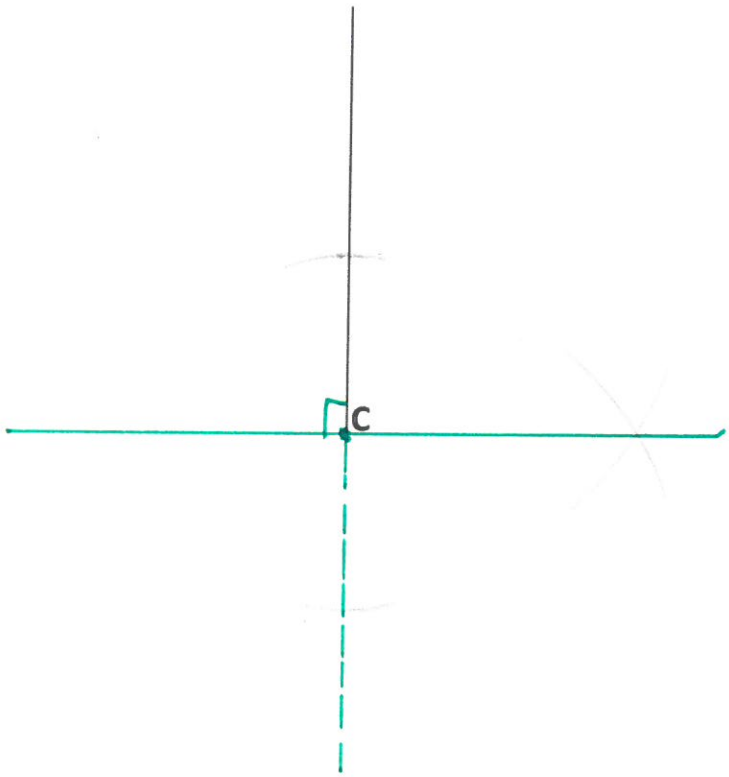
Construct a 30° angle at B



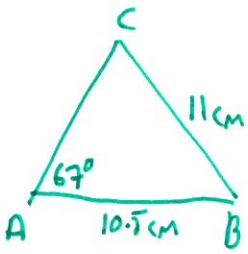


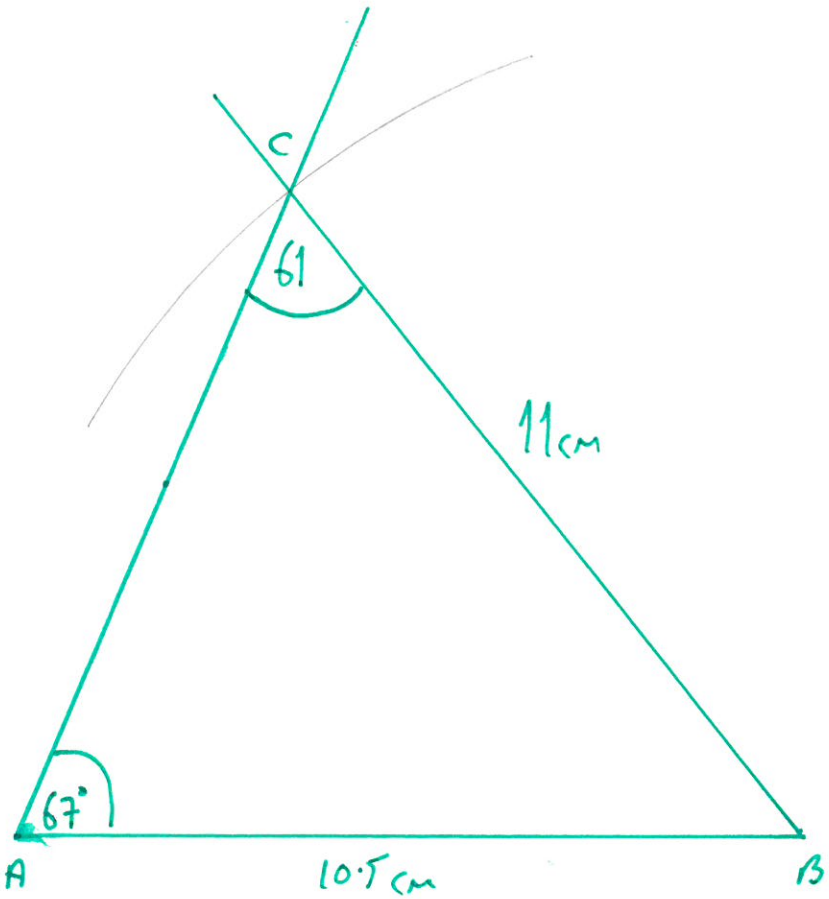
Construct a 90° angle at C





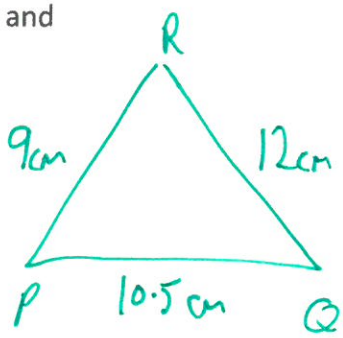
Complete an accurate drawing of triangle ABC in which AB = 10.5cm, angle $\hat{BAC}$ = 67° and BC = 11cm.

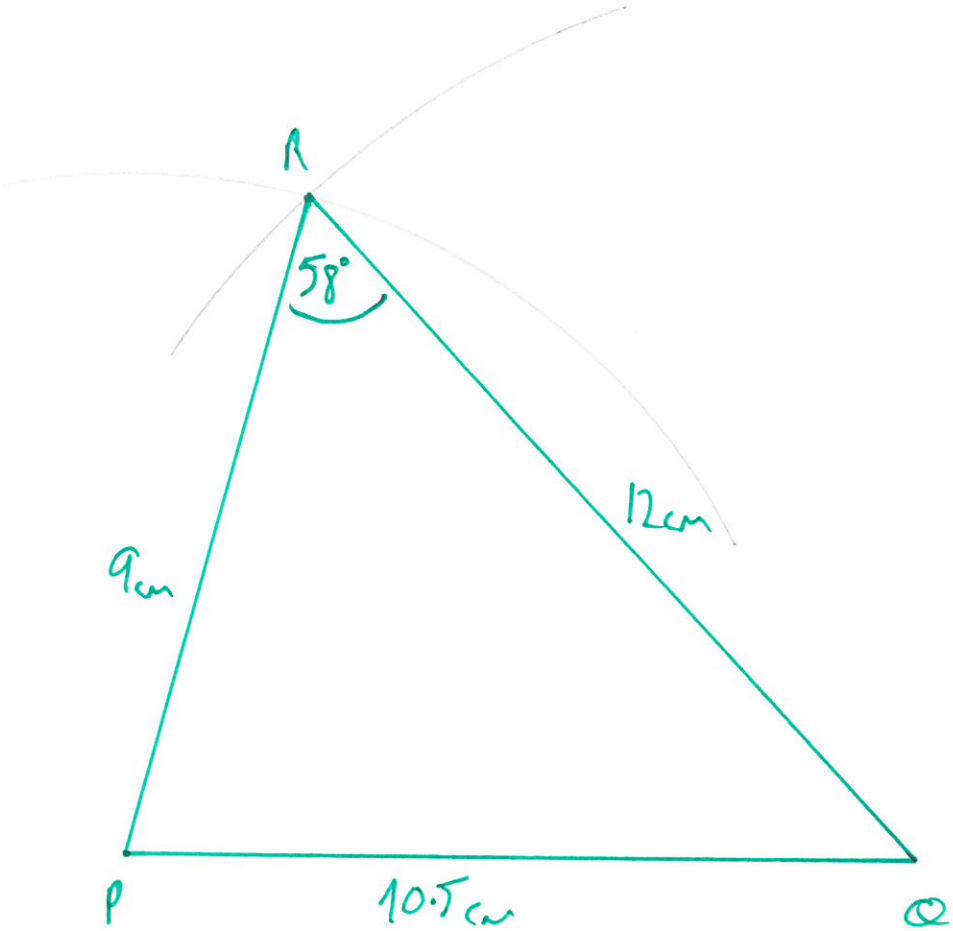




Measure and record the size of angle ACB: 61°

Complete an accurate drawing of triangle PQR in which PQ = 10.5cm, PR = 9cm and QR = 12cm.





Measure and record the size of angle PRQ: 58°

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(b) Each side of this regular polygon is 7 cm.
A sketch of two sides, *AB* and *BC*, of the polygon is shown below.

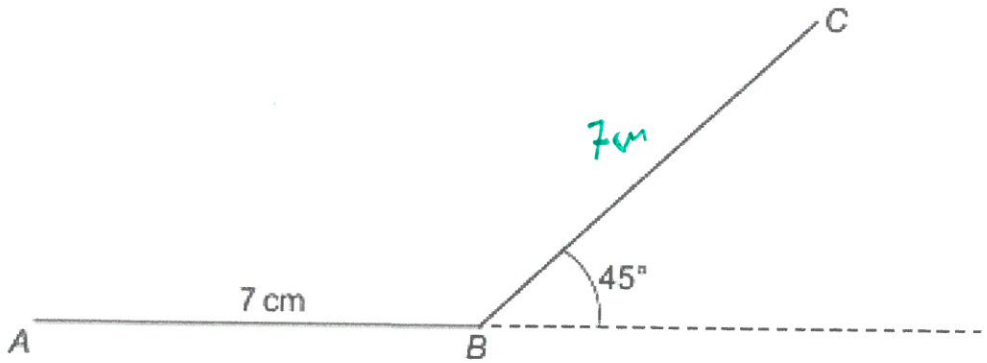
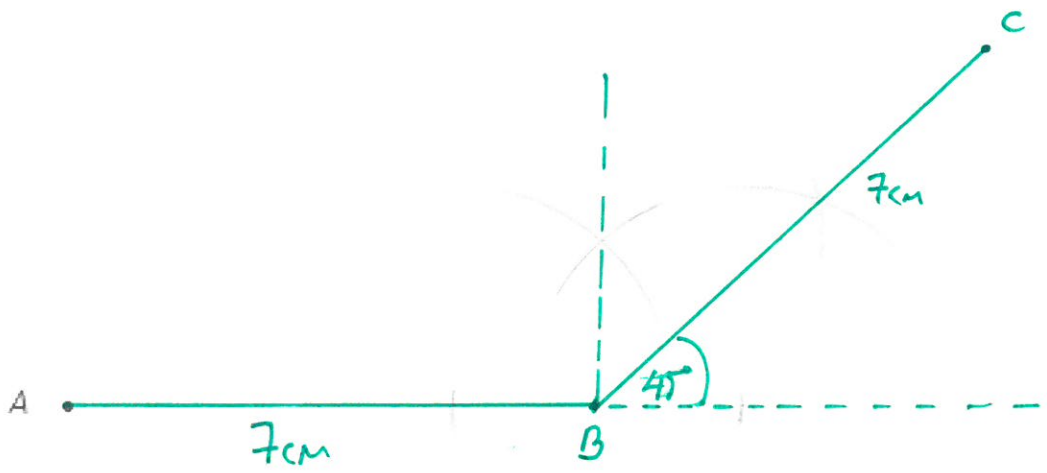


Diagram not drawn to scale

Using only a ruler and a pair of compasses, construct an accurate drawing that shows these **two sides** of the polygon.
The point *A* has been given.
You must show your construction arcs. [4]



Loci

- A **locus** is a path which is formed by a point that moves according to some rule. The plural of locus is **loci**.

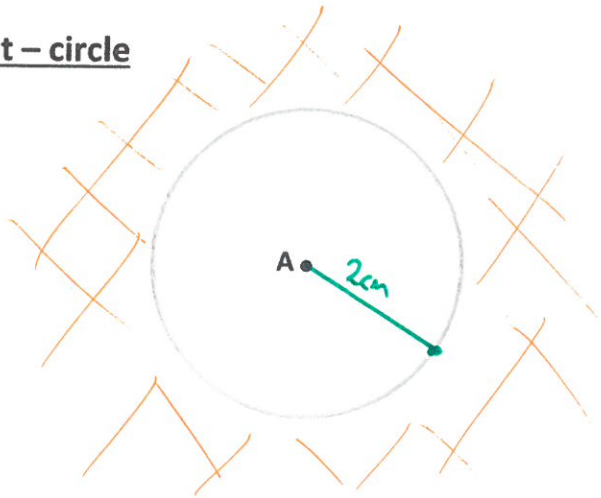
- They are used to identify areas that meet given criteria, such as a given distance from a point or halfway between two lines.

- Loci need to be constructed using standard techniques already met – circle, perpendicular bisector and angle bisector.

- Once the loci have been drawn, the appropriate region has to be found and shaded by interpreting the language of the criteria such as ***at least, at most, no further, within, equidistant…***

- **Locus of a path equidistant from a point – circle**

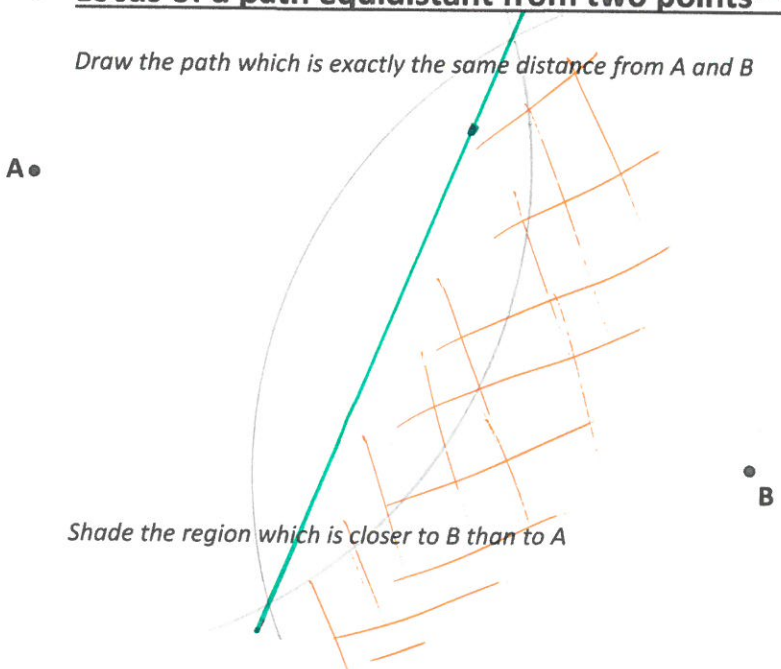
Draw the path which is exactly 2cm from A



Shade the region which is at least 2cm from A

- **Locus of a path equidistant from two points – perpendicular bisector**

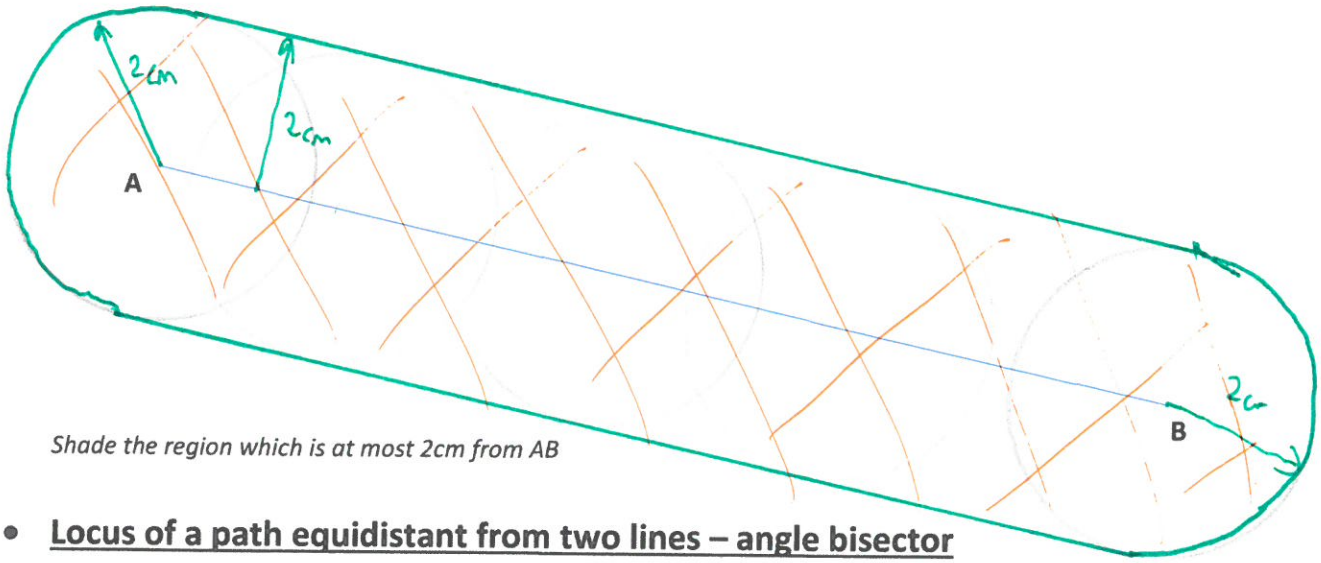
Draw the path which is exactly the same distance from A and B



Shade the region which is closer to B than to A

- **Locus of a path equidistant from a line – parallel line**

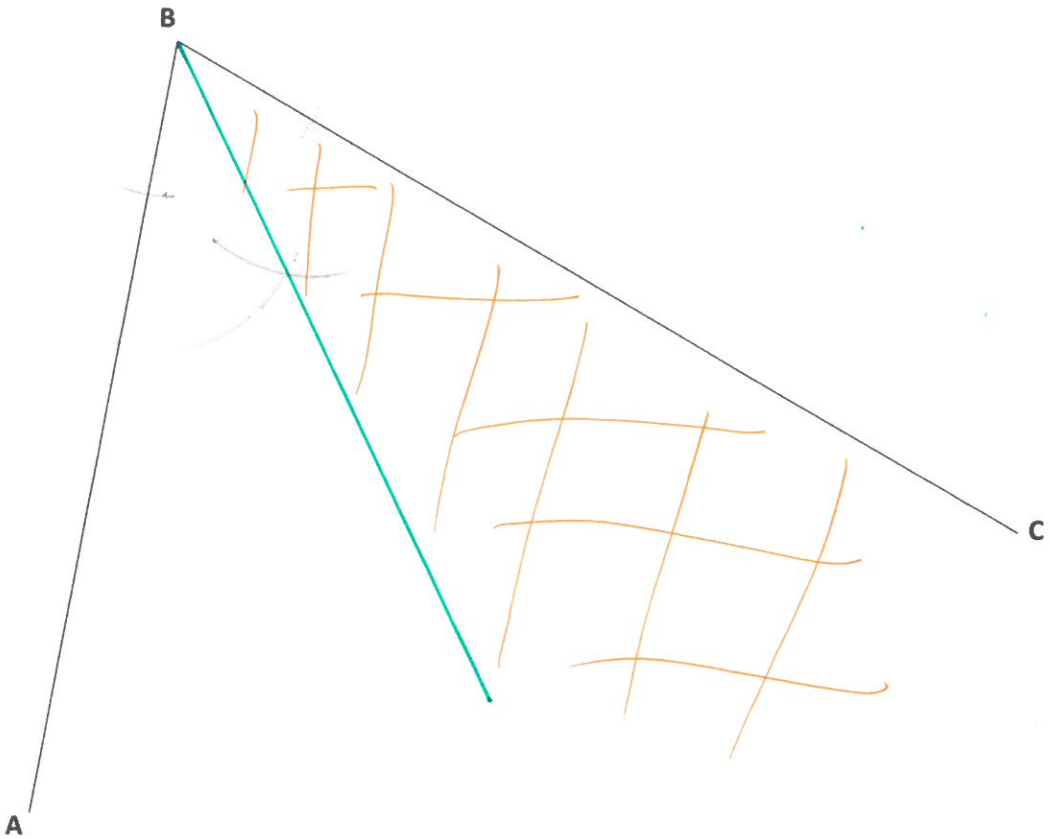
Draw the path which is exactly 2cm from the line AB



Shade the region which is at most 2cm from AB

- **Locus of a path equidistant from two lines – angle bisector**

Draw the path which is exactly the same distance from the lines AB and BC



Shade the region which is further from AB than BC

GCSE Numeracy June 17

(a) *Organics4U* is planning to have its headquarters in Wales.
The manager has instructed Ffion to look for a site for the headquarters.

Here are the instructions that Ffion has been given by her manager.

'Find the point that is
- an equal distance between Wrexham and Aberporth, and
- an equal distance between Caernarfon and Swansea.

The new headquarters needs to be within 20 miles of this point.'

On the map below, shade the region, **in Wales**, that Ffion should identify for her manager. [4]

GCSE Numeracy November 16

The scale diagram opposite shows an Eisteddfod camping field

The camping field is 100 metres long and 80 metres wide.

A river runs along the side *AB*.
There is a hedge along *AD*.
There is a fence along *BC*.
DC is an opening with access to the Eisteddfod camping field.

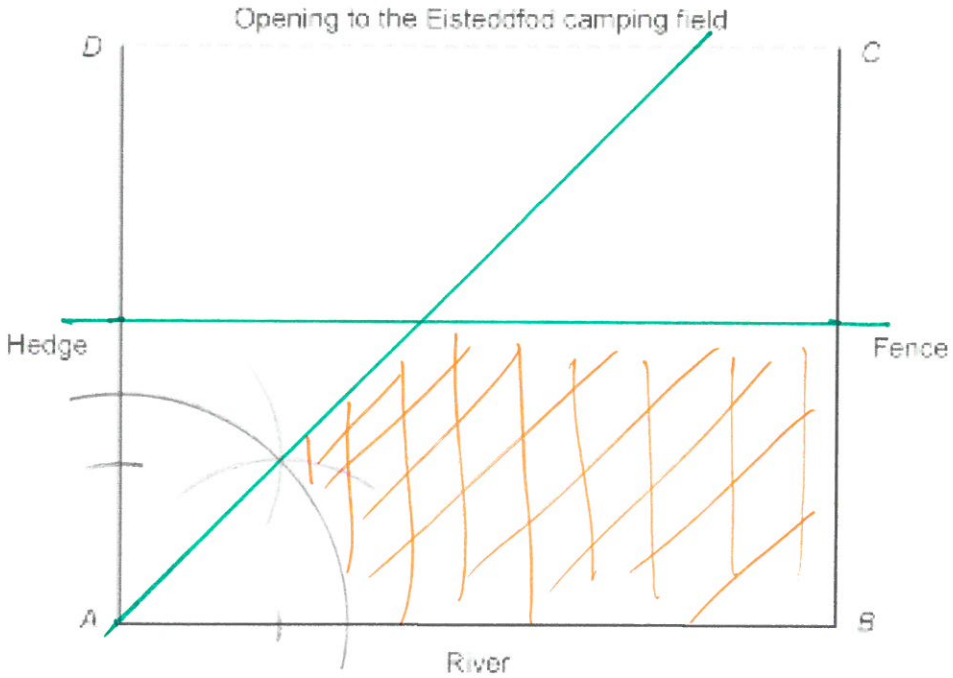
The scale used is **1 cm represents 10 metres**.

A barbecue area is to be built on the camping field

The barbecue area must be
- nearer to the river than to the opening to the Eisteddfod camping field,
- nearer to the river than to the hedge,
- more than 30 metres from the corner of the field where the hedge meets the river.

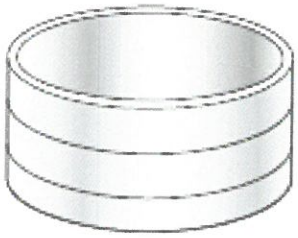
Draw suitable lines on the diagram and shade the region where the barbecue area could be built. [5]

1 cm represents 10 metres



GCSE Numeracy November 2017

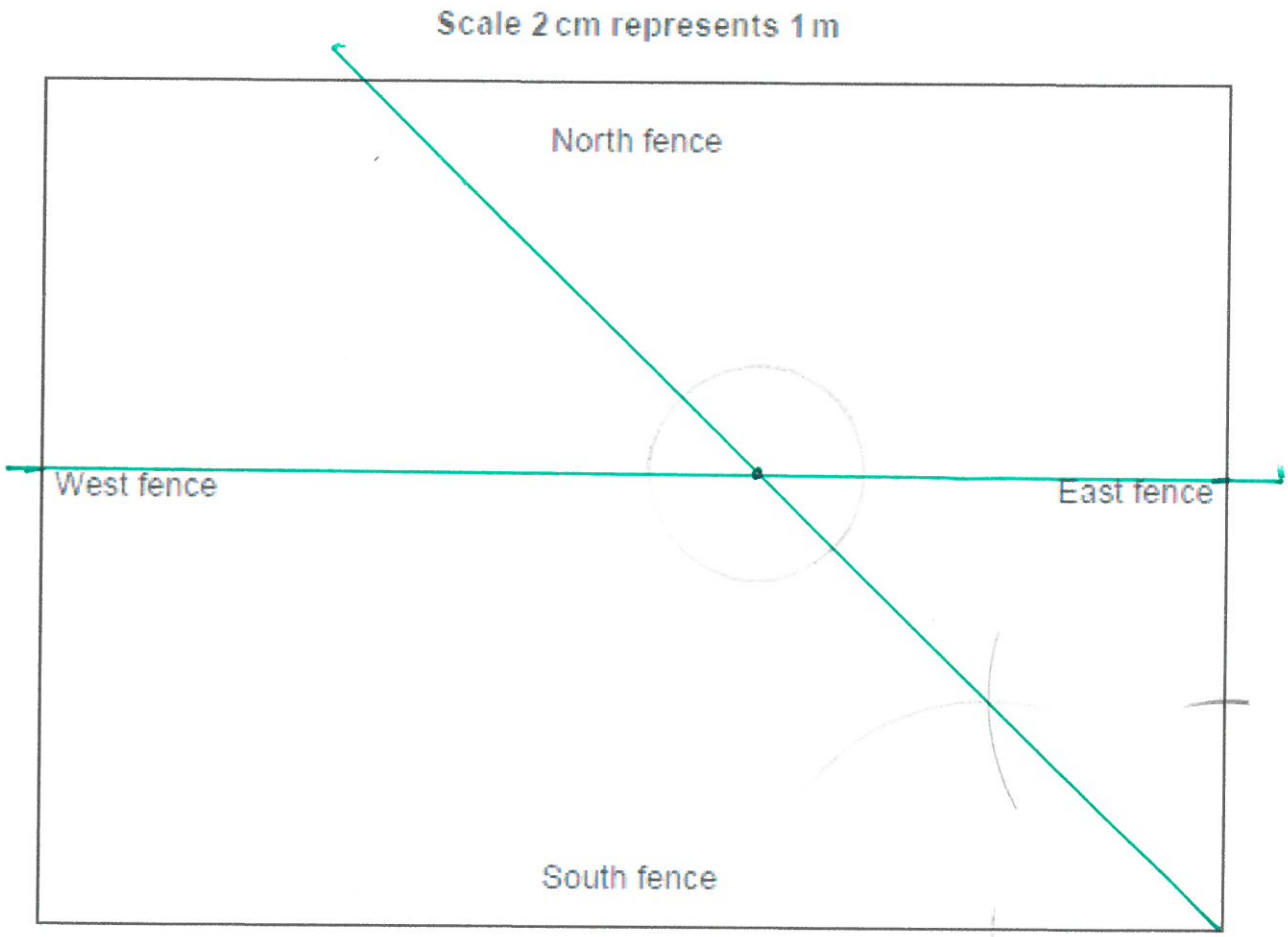
Bronwen decides to place a cylindrical water container in the small paddock on the farm.



0.7 2cm = 1M ×0.7
1.4cm = 0.7M

The water container has a diameter of 1·4 metres.

(i) The scale diagram opposite shows the small paddock on the farm.
The small paddock is rectangular, measuring 7 metres by 5 metres.



Bronwen decides to place the centre of the water container so that it is:
- ✓ equidistant from the south fence and the east fence,
- ✓ 3 metres from the south fence.

Show the placement of the water container on the scale diagram of the small paddock above.
Your diagram should include an accurate plan view of the water container. [4]