

MATHSDIY

GCSE TOPIC BOOKLET

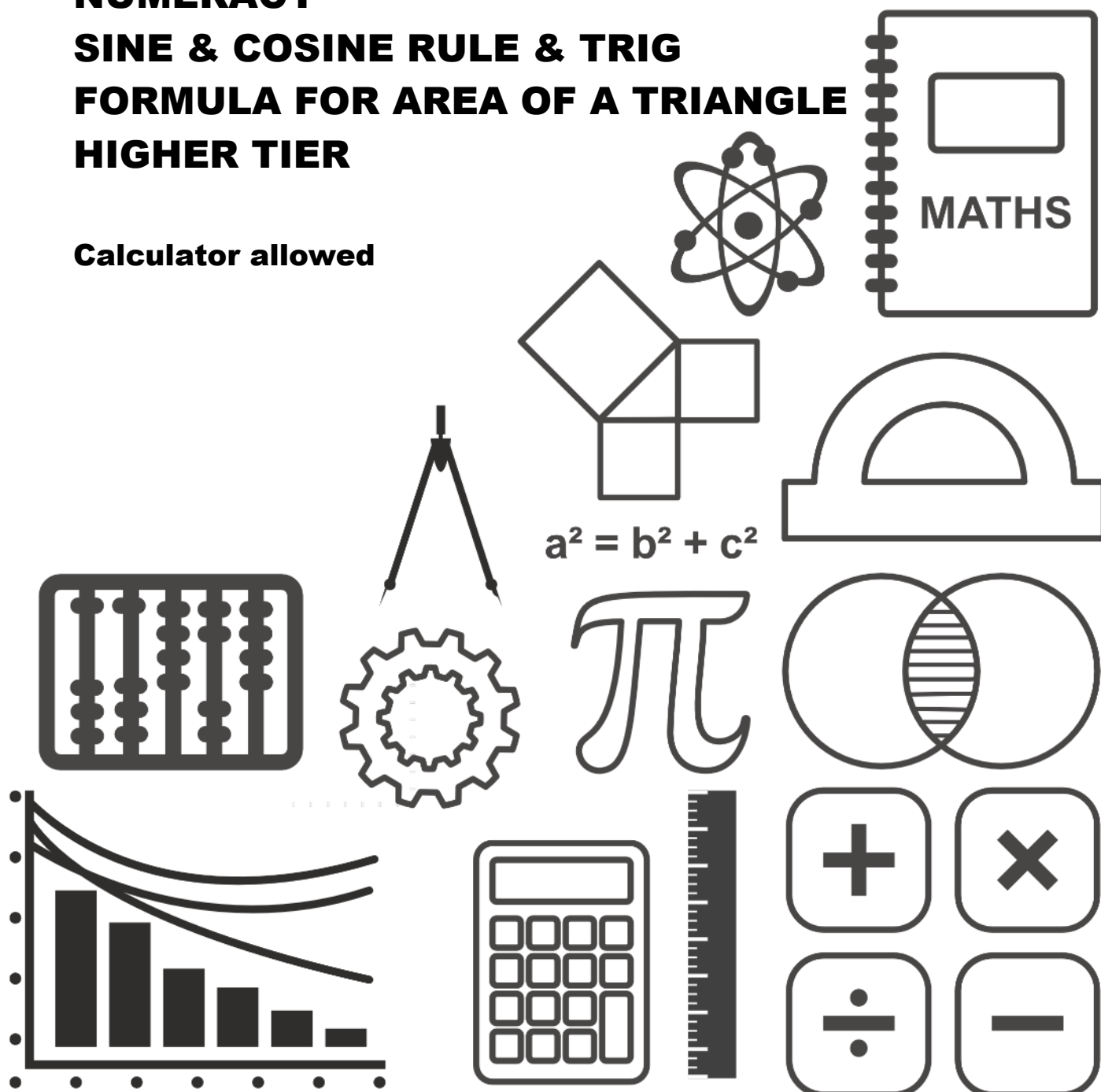
NUMERACY

SINE & COSINE RULE & TRIG

FORMULA FOR AREA OF A TRIANGLE

HIGHER TIER

Calculator allowed



1. A square trapdoor has sides of length 110 cm.
When the trapdoor is fully opened, it makes an angle of 85° with the horizontal.

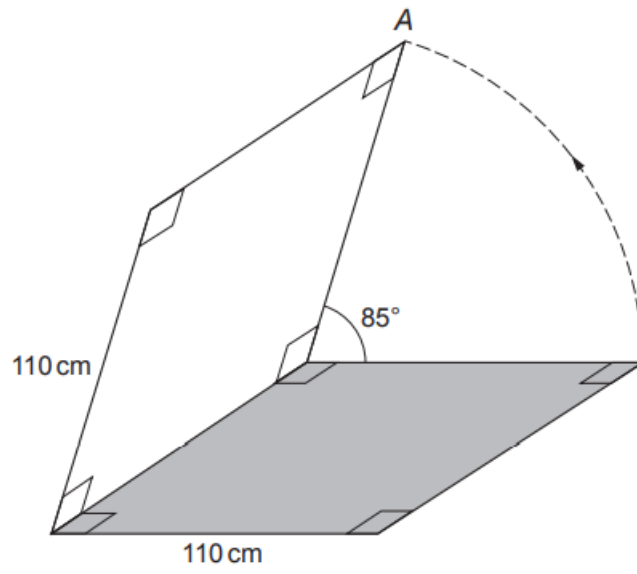


Diagram not drawn to scale

A thin rod is used to hold the trapdoor open in this position. The rod goes from the closed position of point A to a point on the edge of the trapdoor, 16 cm from point A.

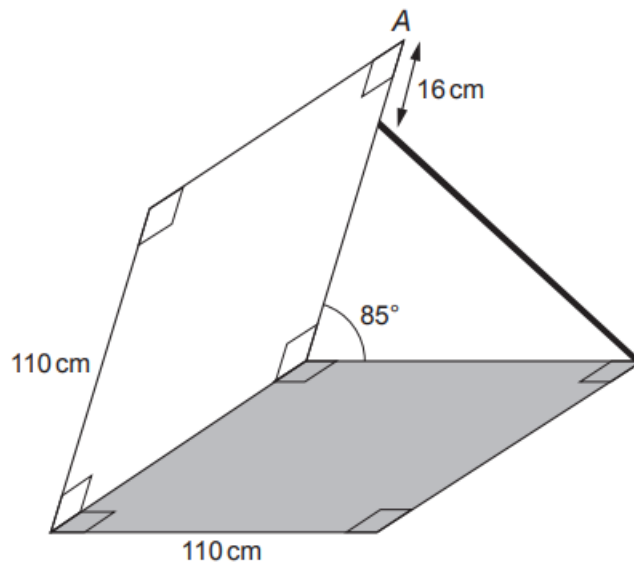


Diagram not drawn to scale

Calculate both the length of the rod and the angle the rod makes with the horizontal. [6]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Length of rod = cm

Angle the rod makes with the horizontal = °

2. Two farmers have bought some farmland between them.
The farmland is in the shape of a quadrilateral $ABCD$, as shown below.

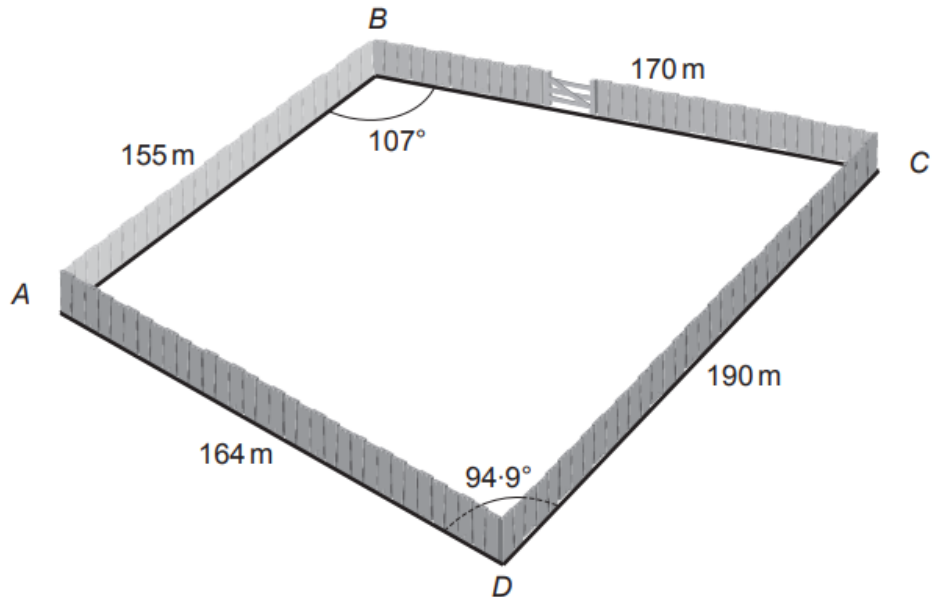


Diagram not drawn to scale

The farmers want to divide the farmland equally by building a straight fence.

- (a) One of the farmers has suggested building the fence from A to C .
Show that this does not divide the farmland equally.

[3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

- (b) To divide the land equally, the fence is built from A to F where $CF = 17.9\text{m}$. To construct the fence, posts are placed at A and F . Other posts are then located along AF , so that the posts are no more than 3m apart.

Calculate the smallest number of posts needed, including the posts at A and F . [5]

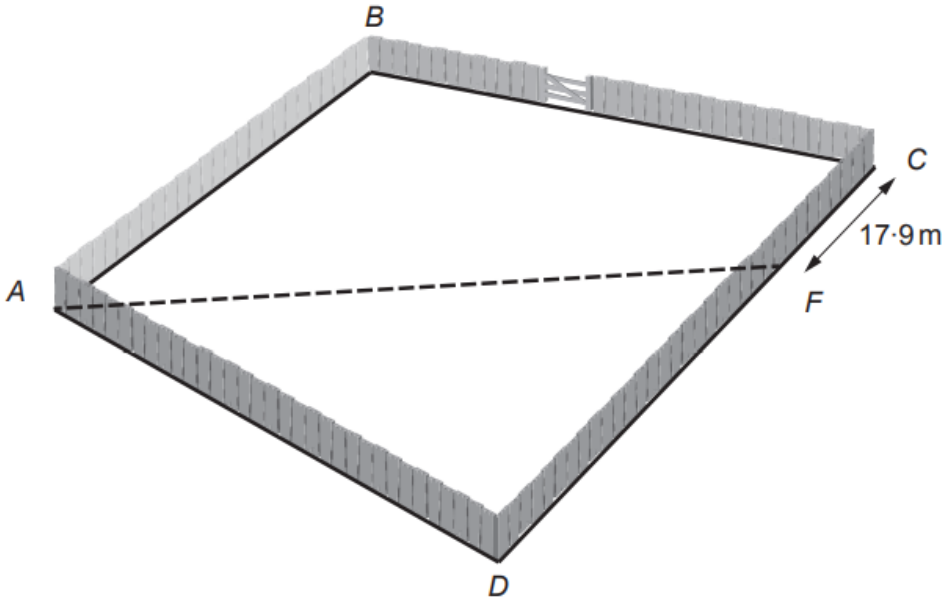


Diagram not drawn to scale

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

3.

Alpha, *Beta* and *Gamma* are three boats. They receive a weather warning and need to go to the port of Aberwyn.

The following diagram shows the positions of the three boats when the weather warning is received.

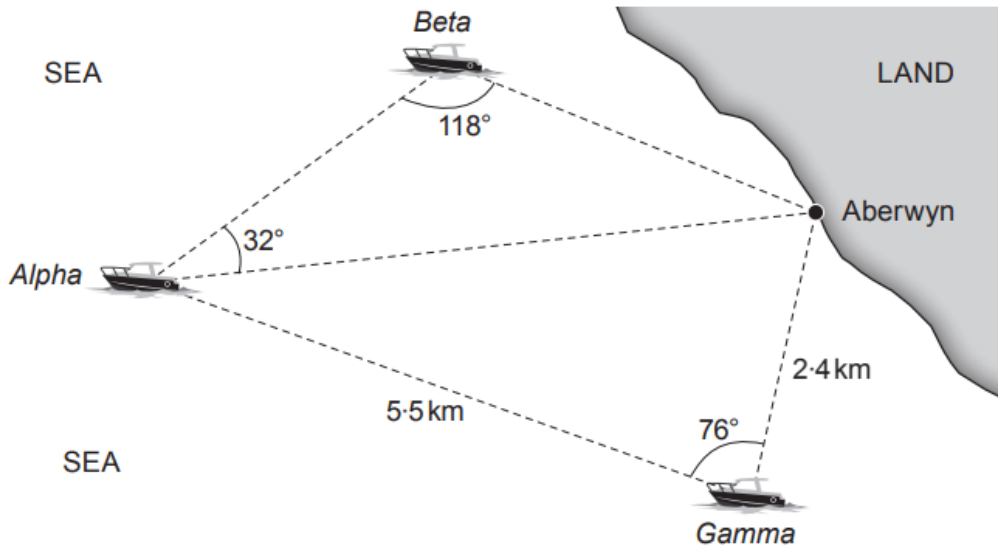


Diagram not drawn to scale

The captains of *Alpha* and *Beta* need to know their distances from Aberwyn in order to find how long it will take them to get to the port.

Calculate the distance of each of the boats *Alpha* and *Beta* from Aberwyn.

[7]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

