

SAMPLE PAPER 4

Leaving Certificate

Mathematics

Paper 2

Ordinary Level

Time: 2 hours, 30 minutes

300 marks

Examination number

Centre stamp

Running total	
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For examiner	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

Grade

Instructions

There are **two** sections in this examination paper.

Section A	Concepts and Skills	150 marks	6 questions
Section B	Contexts and Applications	150 marks	3 questions

Answer all nine questions.

Write your answers in the spaces provided in this booklet. You will lose marks if you do not do so. There is space for extra work at the back of the booklet. You may also ask the superintendent for more paper. Label any extra work clearly with the question number and part.

The superintendent will give you a copy of the *Formulae and Tables* booklet. You must return it at the end of the examination. You are not allowed to bring your own copy into the examination.

Marks will be lost if all necessary work is not clearly shown.

Answers should include the appropriate units of measurement, where relevant.

Answers should be given in simplest form, where relevant.

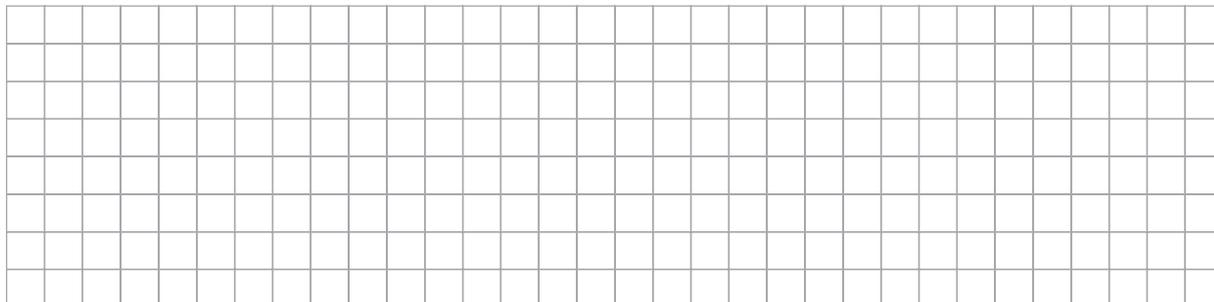
Write the make and model of your calculator(s) here:

Answer **all six** questions from this section.

Question 1**(25 marks)**

A circle has a centre $(1, 2)$ and radius 5.

- (a) Find the equation of the circle.



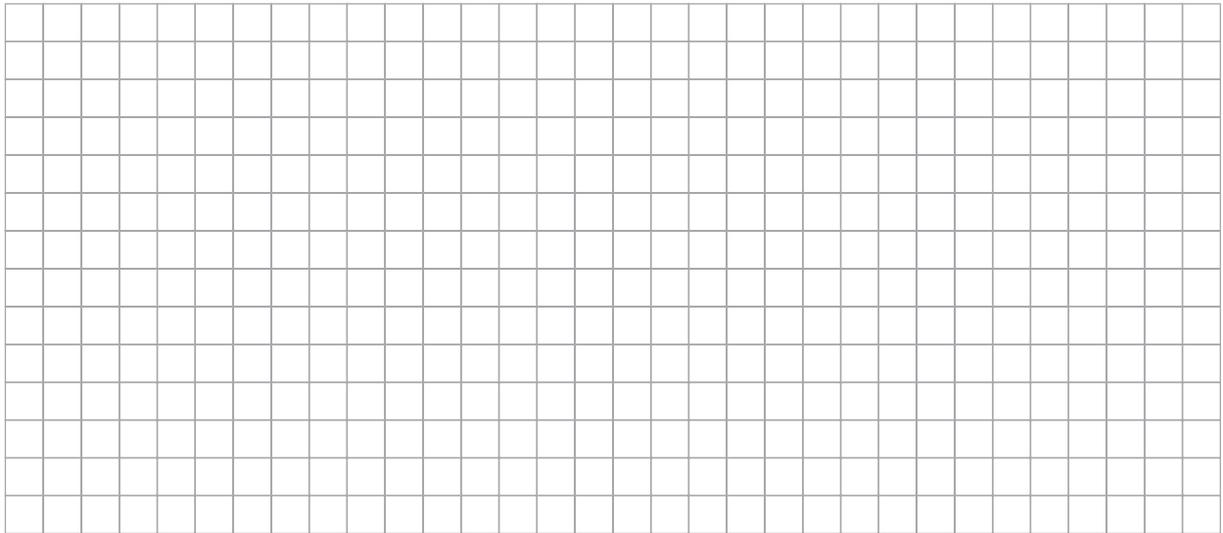
- (b) Find the points P and Q where the circle cuts the x -axis.



- (c) Verify that the point $A(-3, 5)$ is on the circle. Find the equation of the tangent to the circle at A .

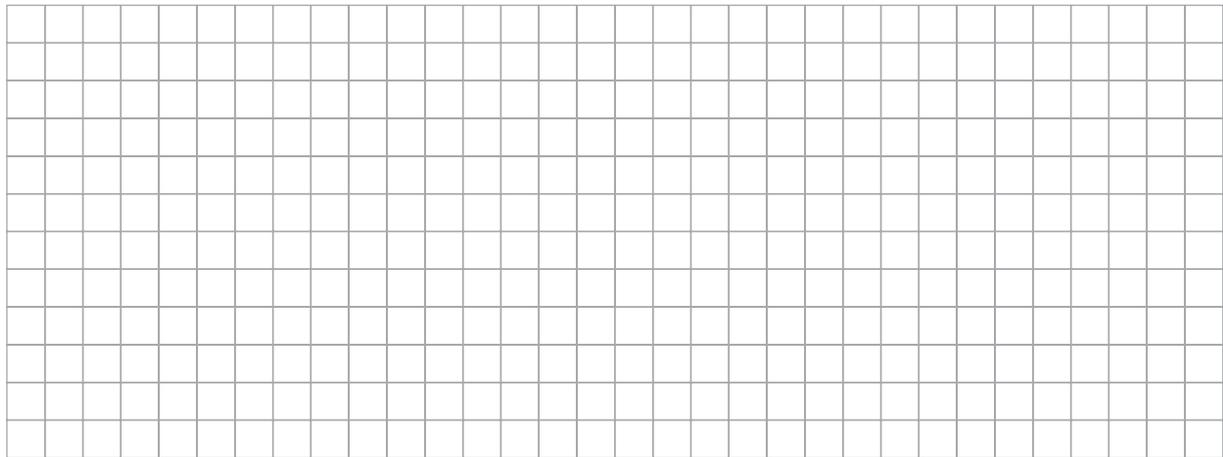


(c) Find the point of intersection E of BE and AD . Show E is a mid-point of $[AD]$.

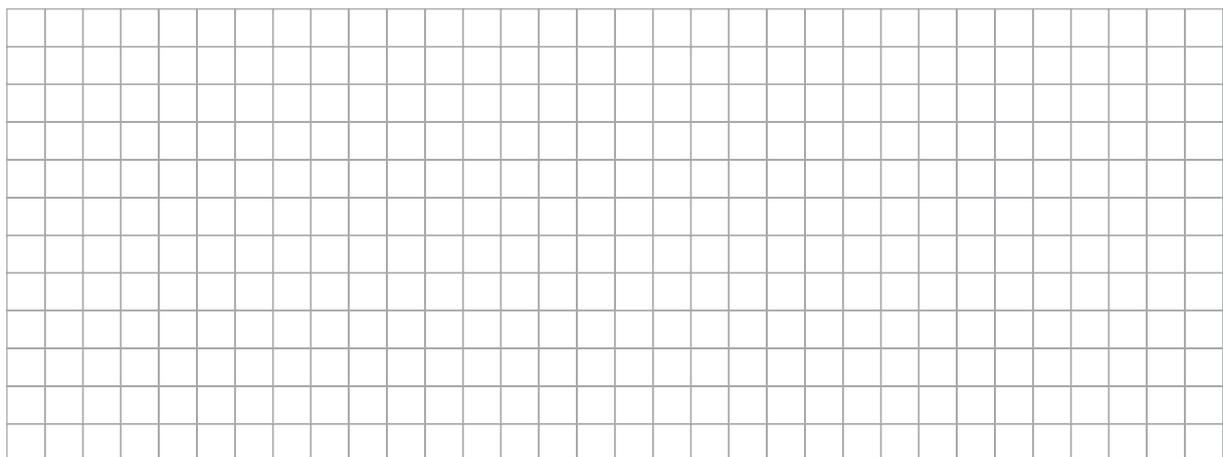


(d) Find the area of parallelogram $ABCD$ using two different methods.

METHOD 1



METHOD 2

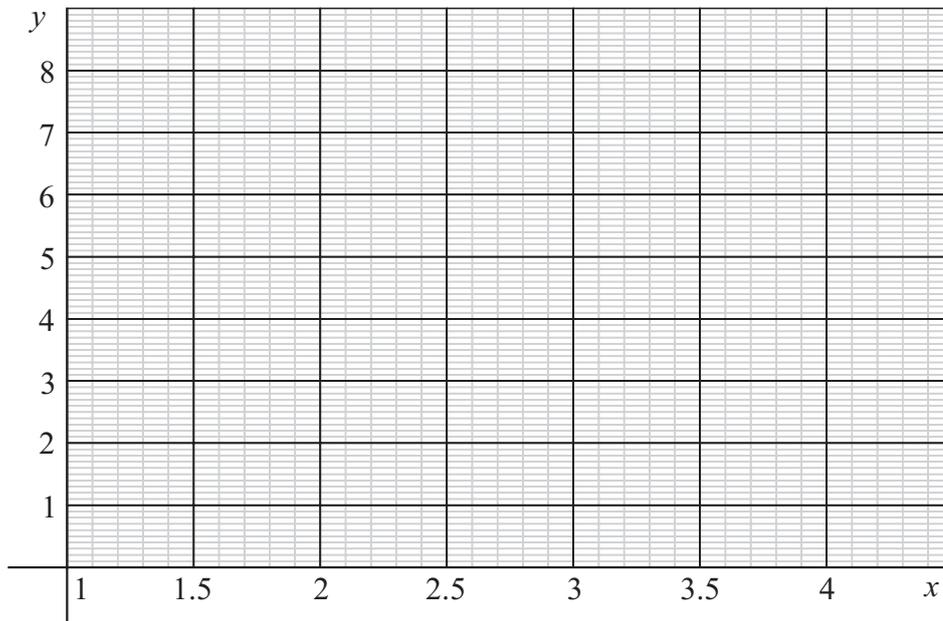


Question 3

(25 marks)

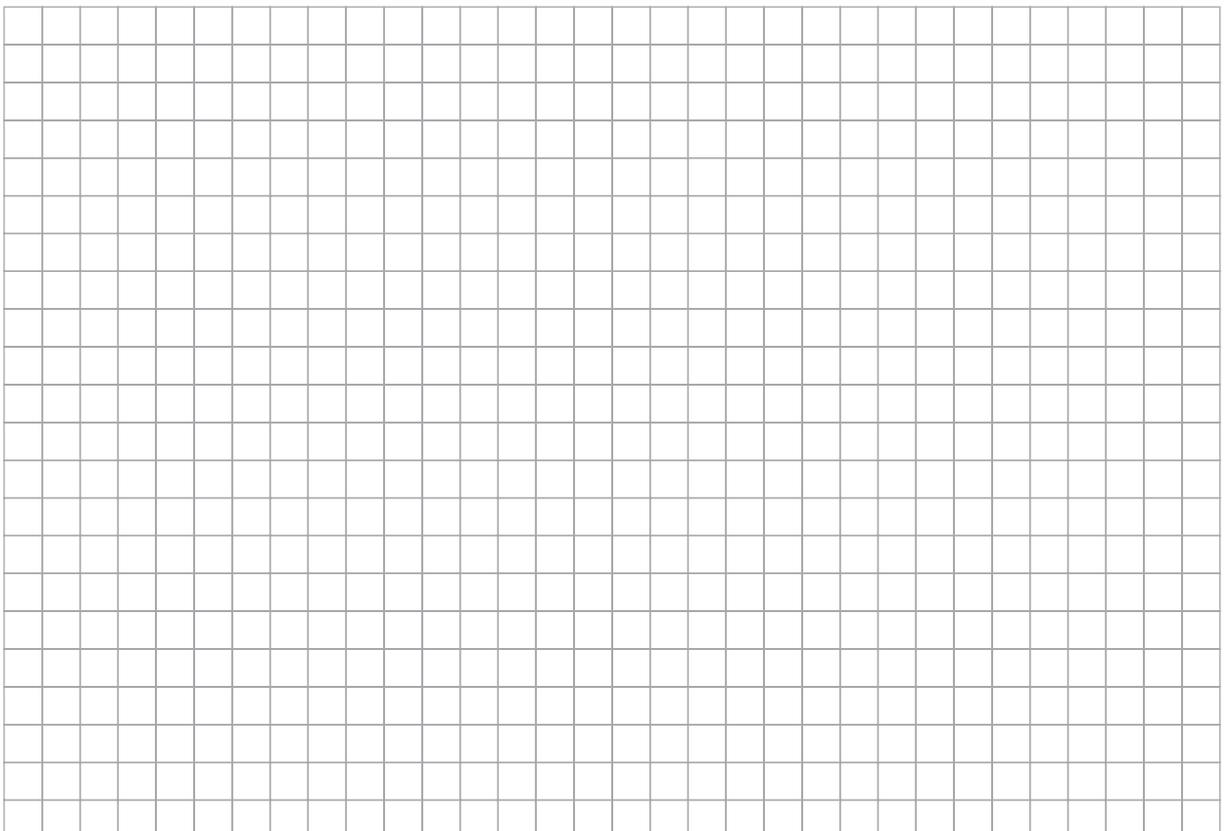
(a) Plot the curve given by the data in the table below on the grid shown.

x	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	8.0	6.0	5.3	4.8	4.4	4.2	4.0



(b) Divide the area under the curve into six strips from $x = 1$ to $x = 4$.

(c) Use the trapezoidal rule to estimate the area under the curve from $x = 1$ to $x = 4$.

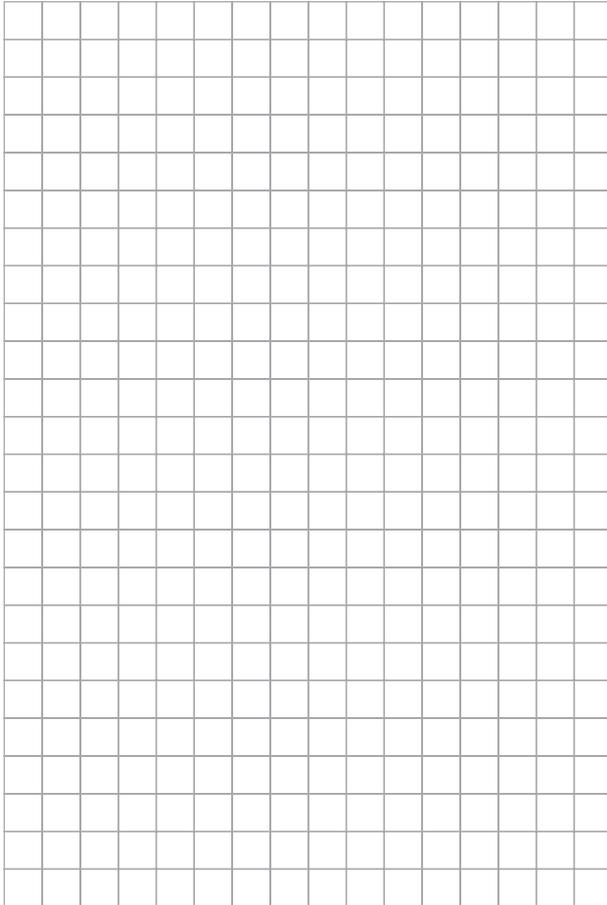
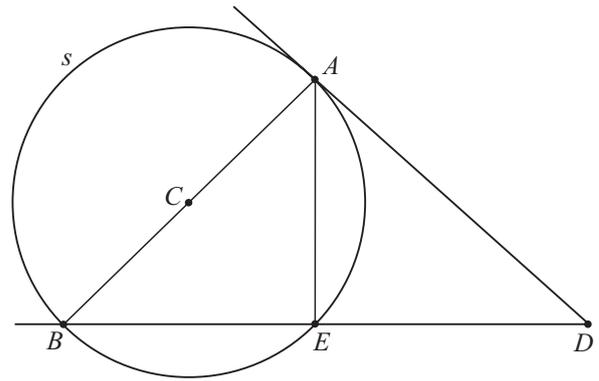


Question 6

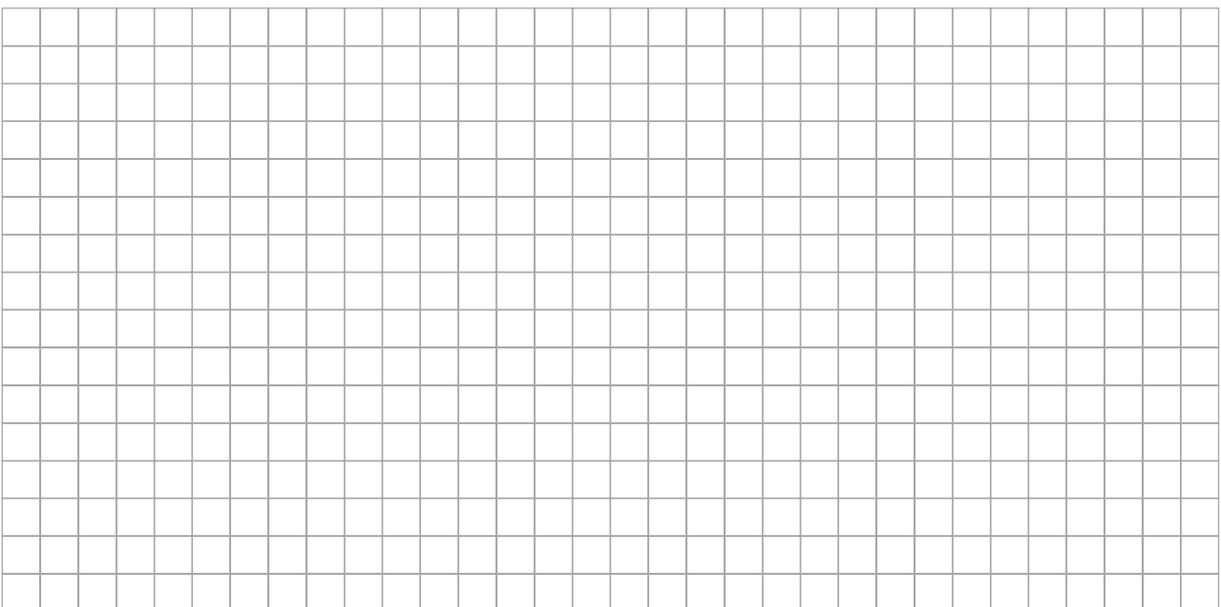
(25 marks)

C is the centre of circle s . $[AD]$ is a tangent at A to s and $[BE]$ is a chord of s which meets the tangent at D .

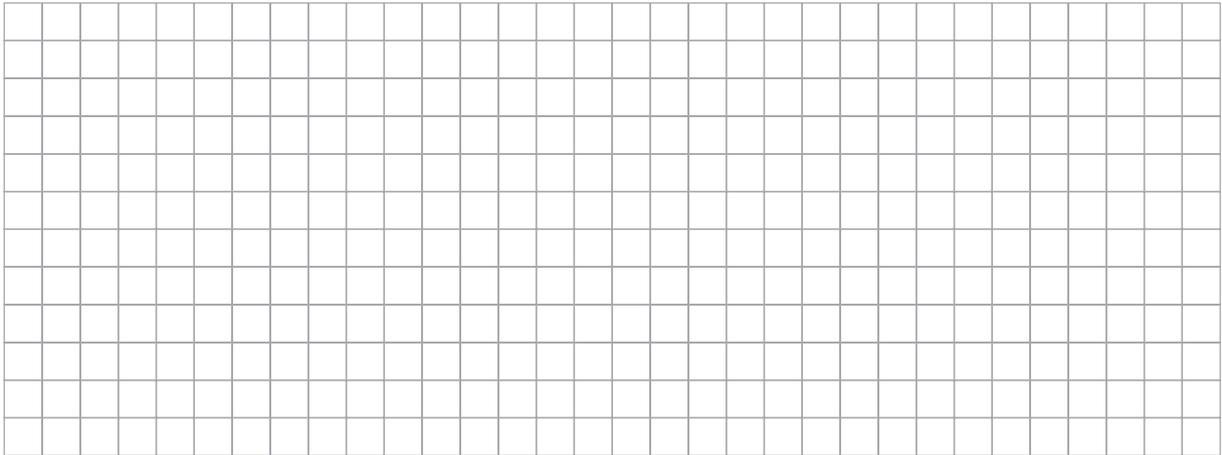
(a) If $|AB| = |AD|$, prove that $|BE| = |ED|$.



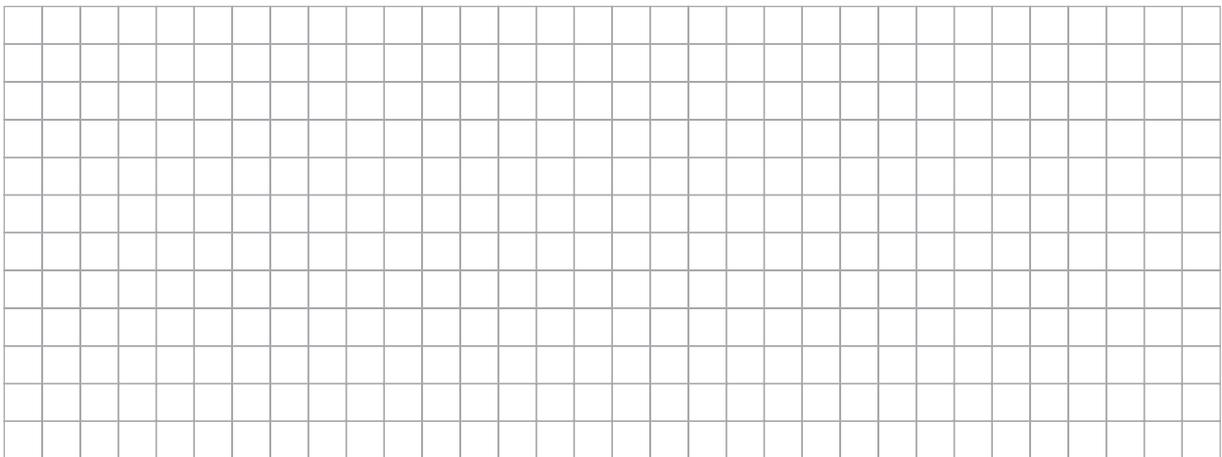
(b) Find $|\angle EDA|$.



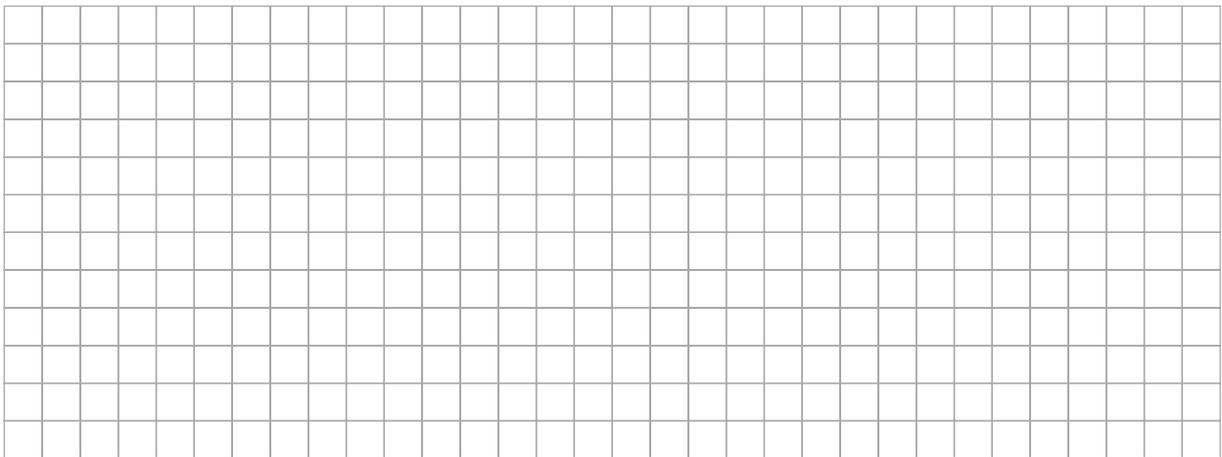
(e) Find the curved surface area of the tent, to one decimal place.



(f) Find the total area of material required to make the tent, to one decimal place



(g) Find the volume of air in the tent, to one significant number.



Question 9

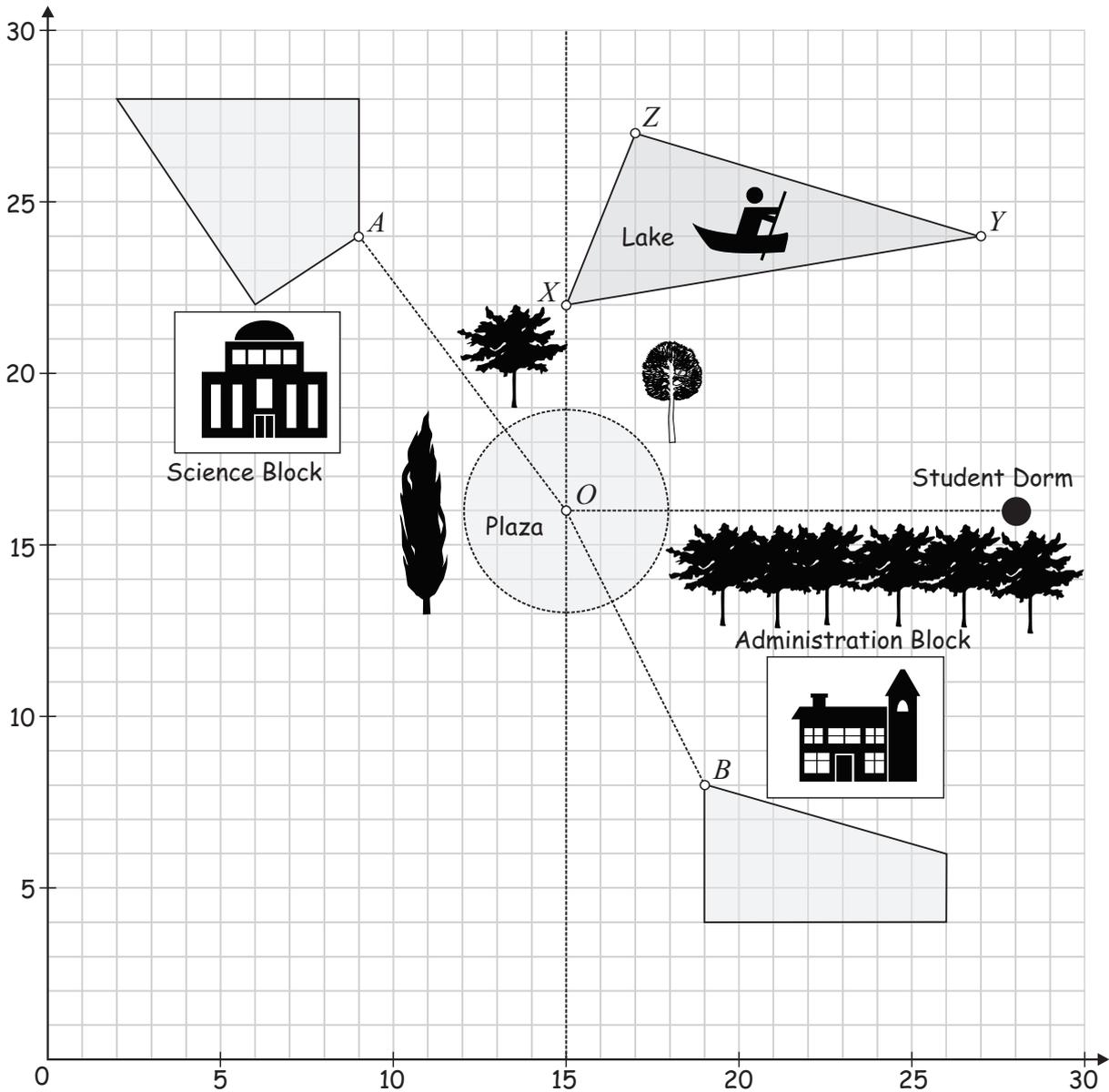
(65 marks)

Part of the campus of a university is laid out on a grid as shown below. Each unit on the grid represents a distance of 20 m.

The following features are shown:

- A Science block which students enter through gate *A*
- A lake *XYZ* which is used mainly for canoeing
- A central plaza with centre *O*
- A student dorm
- An administration block which is entered by students through gate *B*

A series of paths, represented by broken lines, links the various places on the campus together.



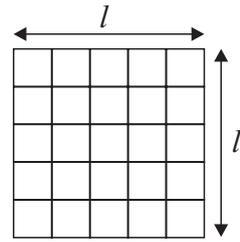
(a) A small part of the grid used to map the campus is shown.

Write down the length of the side l :

Length $l =$ _____ units $=$ _____ m

Write down the area A of the shape:

Area $A =$ _____ units squared $=$ _____ m^2

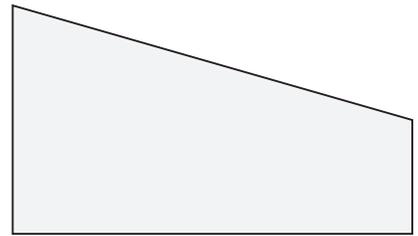
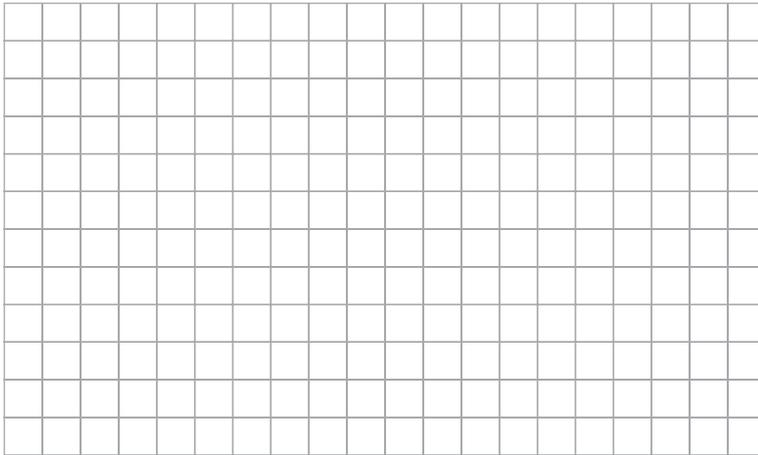


When converting units of length to metres multiply by a factor of _____ .

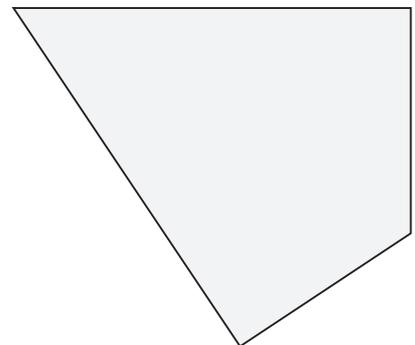
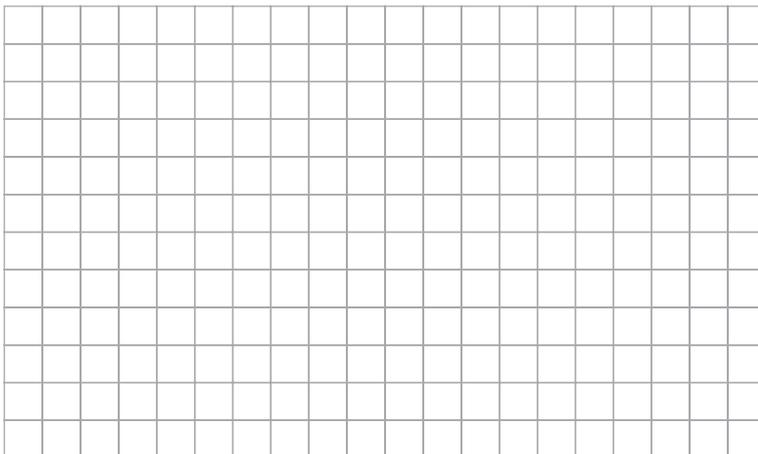
When converting units squared of area to m^2 multiply by a factor of _____ .

(b) Find the areas of the grounds on which the Administration block and the Science block stand by dividing their shapes into smaller shapes whose areas you can calculate. Show your work clearly with all your measurements shown on the shapes below.

ADMINISTRATION BLOCK

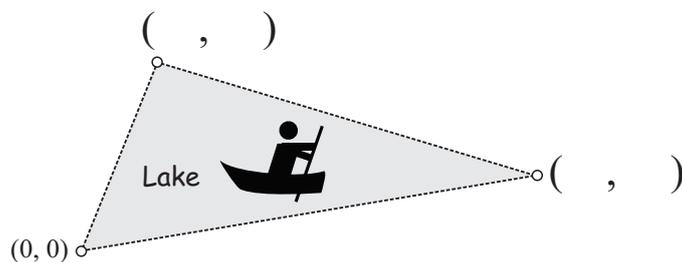


SCIENCE BLOCK



(c) Find the area of the lake XYZ using the following method:

- (i) Translate (slide) the triangle XYZ such that point X lands on the origin $(0, 0)$.
On the main grid at the beginning of the question, draw in the new triangle writing in the coordinates of the new points.



- (ii) Use the formula $A = \frac{1}{2} |x_1y_2 - x_2y_1|$ to find the area of the lake.



- (d) (i) Write in the coordinates of A , the gate to the Science block, O , the centre of the plaza, and B , the gates to the Administration block.

$$A = (\quad , \quad)$$

$$O = (\quad , \quad)$$

$$B = (\quad , \quad)$$

- (ii) A student walks from the gate of the Science block to the gate of the Administration block along the path AOB . What distance is this to the nearest metre?

