



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2018

Mathematics

Paper 2

Ordinary Level

Monday, 11 June – Morning 9:30 to 12:00

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 may lose marks if you do not do so. You may 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.

You may lose marks if your solutions do not include supporting work.

You may lose marks if you do not include appropriate units of measurement, where relevant.

You may lose marks if you do not give your answers 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) An experiment consists of throwing two fair, standard, six-sided dice and recording the sum of the two numbers thrown. Some of the totals are shown in the table.

(i) Complete the table.

(ii) Find the probability of getting a total of 7 or 11.

		Die 1					
		1	2	3	4	5	6
Die 2	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6			9	10
	5	6		8	9		11
	6		8	9	10	11	

(iii) Find the probability of getting a total which is a prime number.

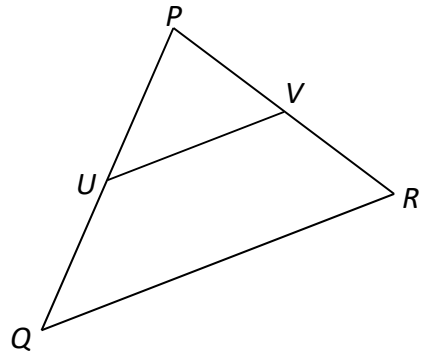
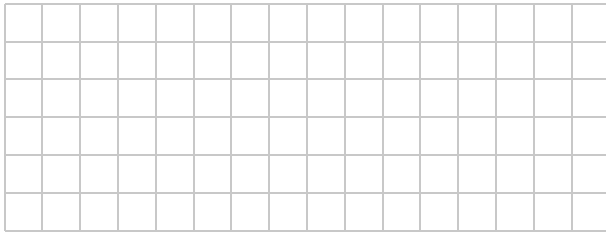
(b) A car distributor sells Ford cars and Renault cars. It has 30 cars for sale on a particular day; 18 are Ford cars and 12 are Renault cars. 7 of the Ford cars are red and 4 of the Renault cars are red. One of the 30 cars is chosen at random. What is the probability that the car chosen is a Ford car **or** a car which is **not** red?

Question 2

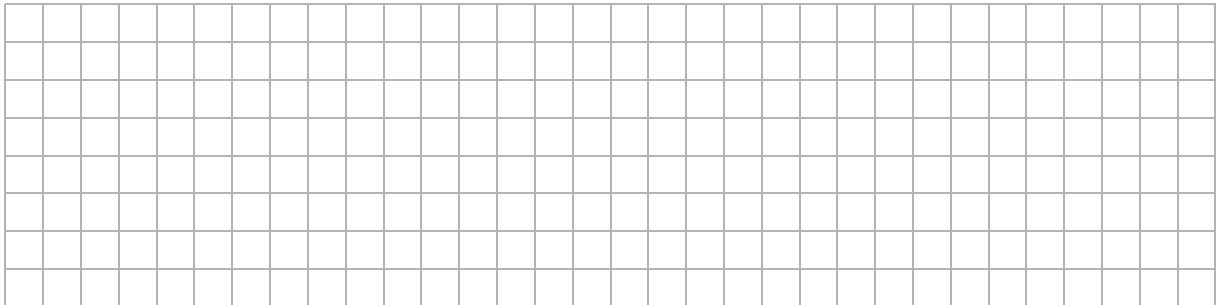
(25 marks)

The points $P(7, 10)$, $Q(1, 2)$ and $R(11, 4)$ are the vertices of the triangle shown.
The point $U(4, 6)$ is the midpoint of $[PQ]$ and the point V is the midpoint of $[PR]$.

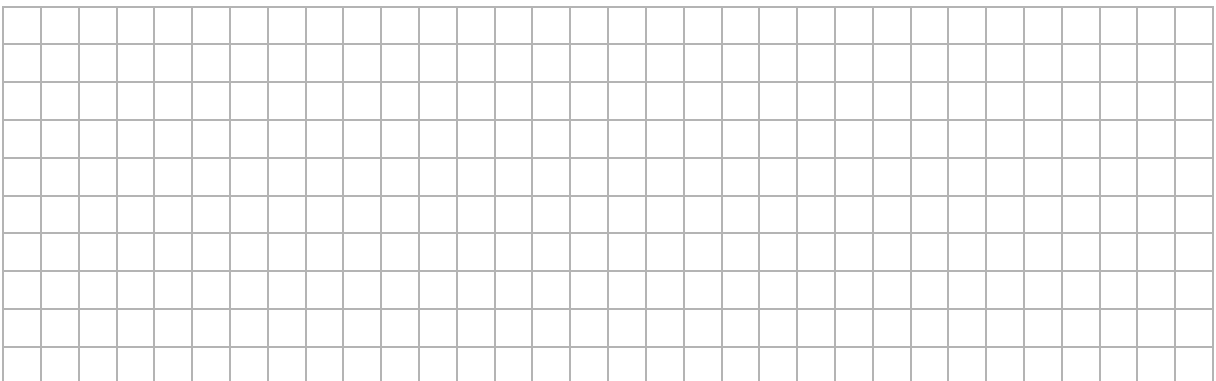
- (a)** Find the co-ordinates of V .



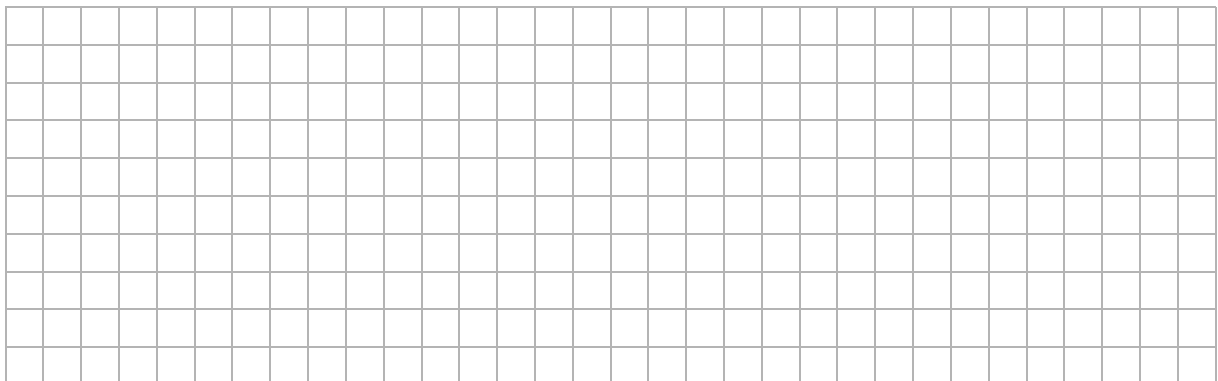
- (b)** Show, by using slopes, that UV is parallel to QR .



- (c)** Find the area of the triangle PQR .



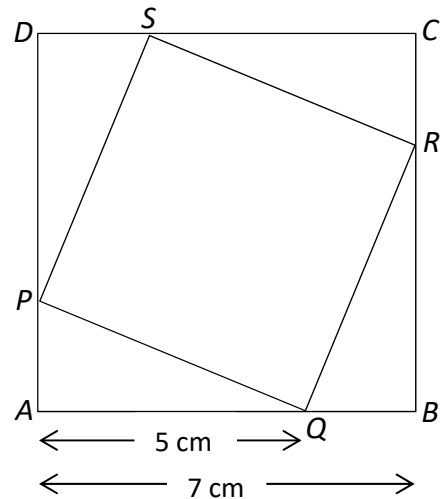
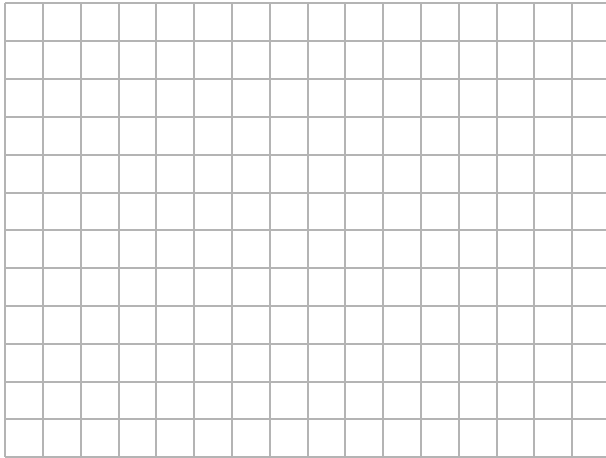
- (d)** The point S is the image of the point Q under the translation \overrightarrow{UV} .
Find the coordinates of S .



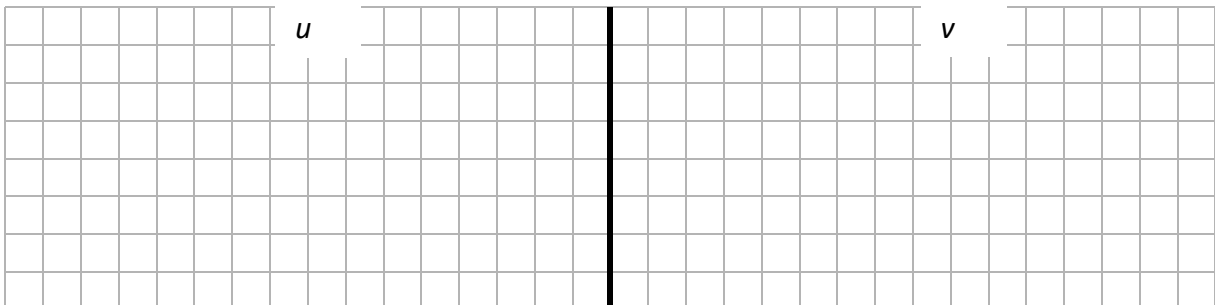
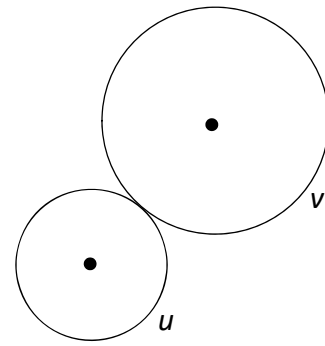
Question 5

(25 marks)

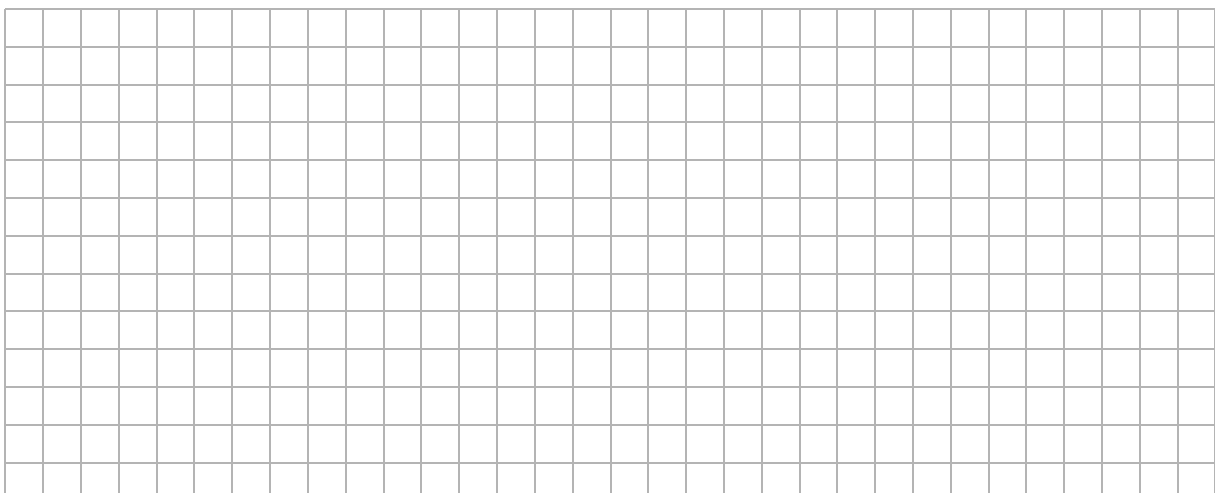
- (a) The square $ABCD$ has sides of length 7 cm. The vertices of the square $PQRS$ lie on the perimeter of $ABCD$, as shown in the diagram, with $|AQ| = 5$ cm. Find the area of the square $PQRS$.



- (b) The circles u and v represent two wheels that are free to rotate about their centres, as shown. The radius of u is 4 cm and the radius of v is 6 cm.
- (i) Find the length of the circumference of **each** circle. Give your answers in cm in terms of π .



- (ii) The wheels u and v are in non-slip contact and therefore the rotation of one causes the other to rotate. Find the number of complete rotations wheel u makes if wheel v completes 100 rotations.



Question 6

(25 marks)

- (a) (i) Construct the triangle ABC , where $|AB| = 10$ cm, $|\angle CAB| = 60^\circ$ and $|\angle ABC| = 40^\circ$. Label each vertex clearly.

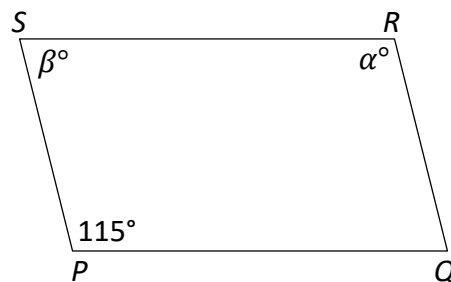
- (ii) Measure $|BC|$, and write your answer in cm, correct to 1 decimal place.



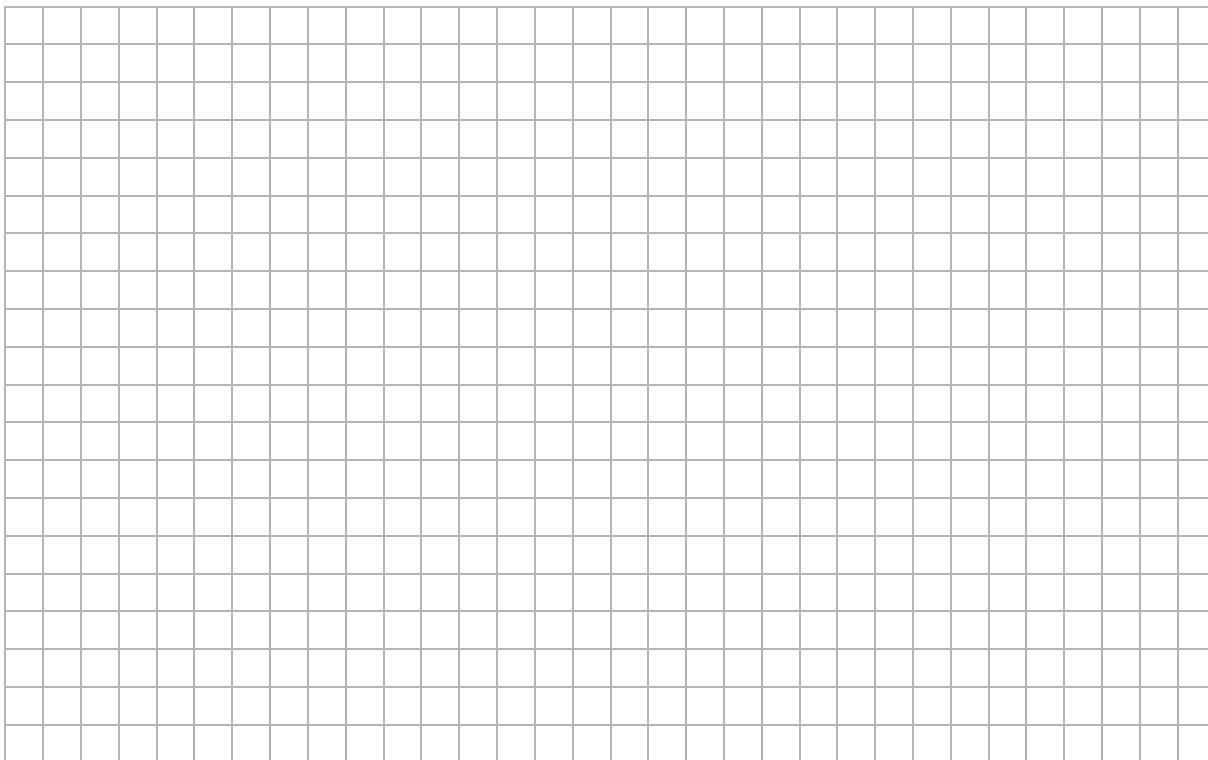
- (b) The diagram shows a parallelogram with vertices P , Q , R , and S .
 $|\angle SPQ| = 115^\circ$, $|\angle QRS| = \alpha^\circ$ and $|\angle RSP| = \beta^\circ$.

- (i) Write down the value of α and the value of β .

$\alpha =$ _____ $\beta =$ _____



- (ii) Explain why the triangle PQR is congruent to triangle RSP .
 Give a reason for any statement you make in your explanation.

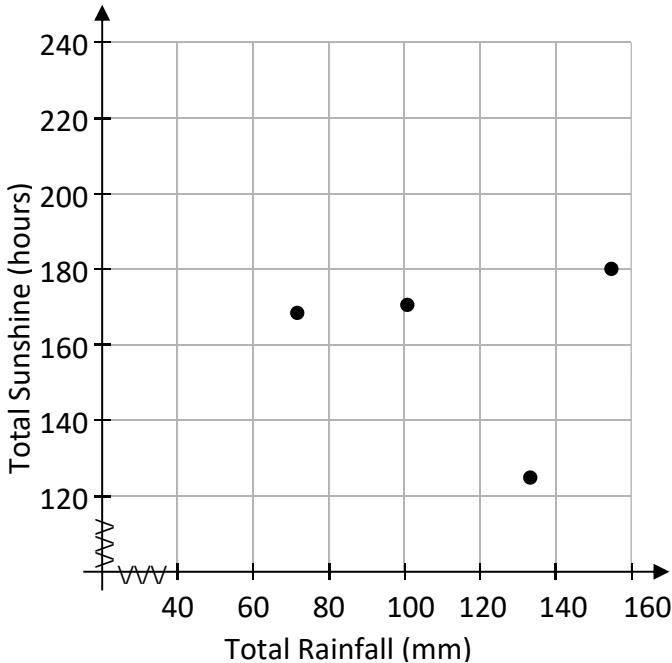


(ii) For what years was the **sunshine data** within 5% of the mean number of sunshine hours in Valentia?

(e) Find the standard deviation of the **rainfall data**, in mm, correct to 1 decimal place.

(f) Part of a scatterplot of the data in the table is shown below. The first four data points are plotted.

(i) Complete the scatterplot.



	Tick one box
0.6	<input type="checkbox"/>
0.1	<input type="checkbox"/>
-0.1	<input type="checkbox"/>
-0.6	<input type="checkbox"/>

(ii) One of the numbers in the table on the right is the correlation coefficient for the data above, correct to 1 decimal place. Based on the scatterplot, select the number that you think most accurately reflects this data. Explain your choice.

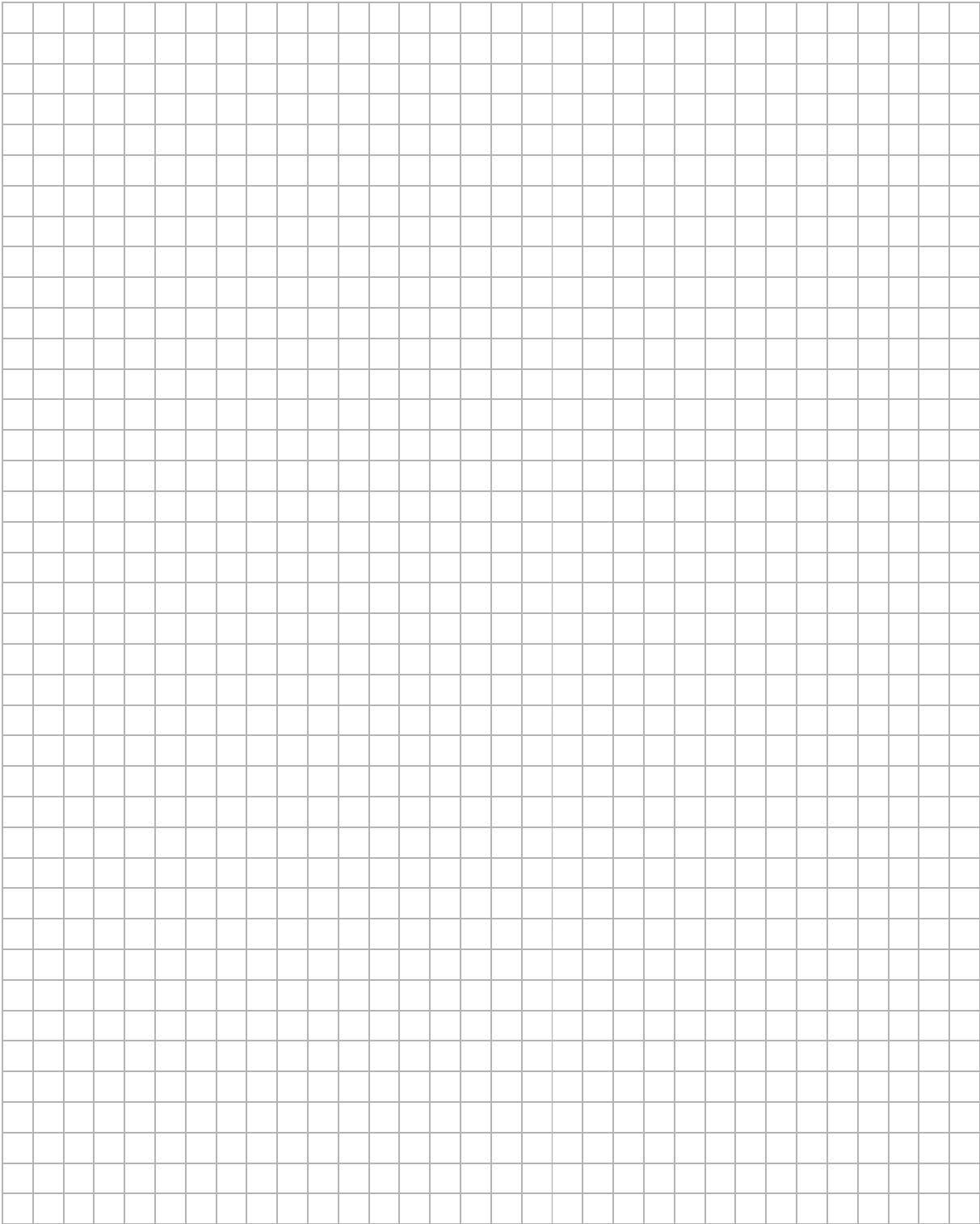
Explanation:

- (d) Use the Cosine Rule to find the length of $[RS]$.
Give your answer correct to the nearest metre.

✓

- (e) SQT is a sector of a circle whose centre is Q .
Find the length of the arc TS .
Give your answer in metres, correct to one decimal place.

- (f) Find the area of the sector SQT .
Give your answer in square metres, correct to one decimal place.



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