



Pre-Leaving Certificate Examination, 2015
Triailscrúdú na hArdteistiméireachta, 2015

Mathematics

Paper 2

Higher Level

2½ hours

300 marks

Name:
School:
Address:
Class:
Teacher:

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

Running total	
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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. 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.

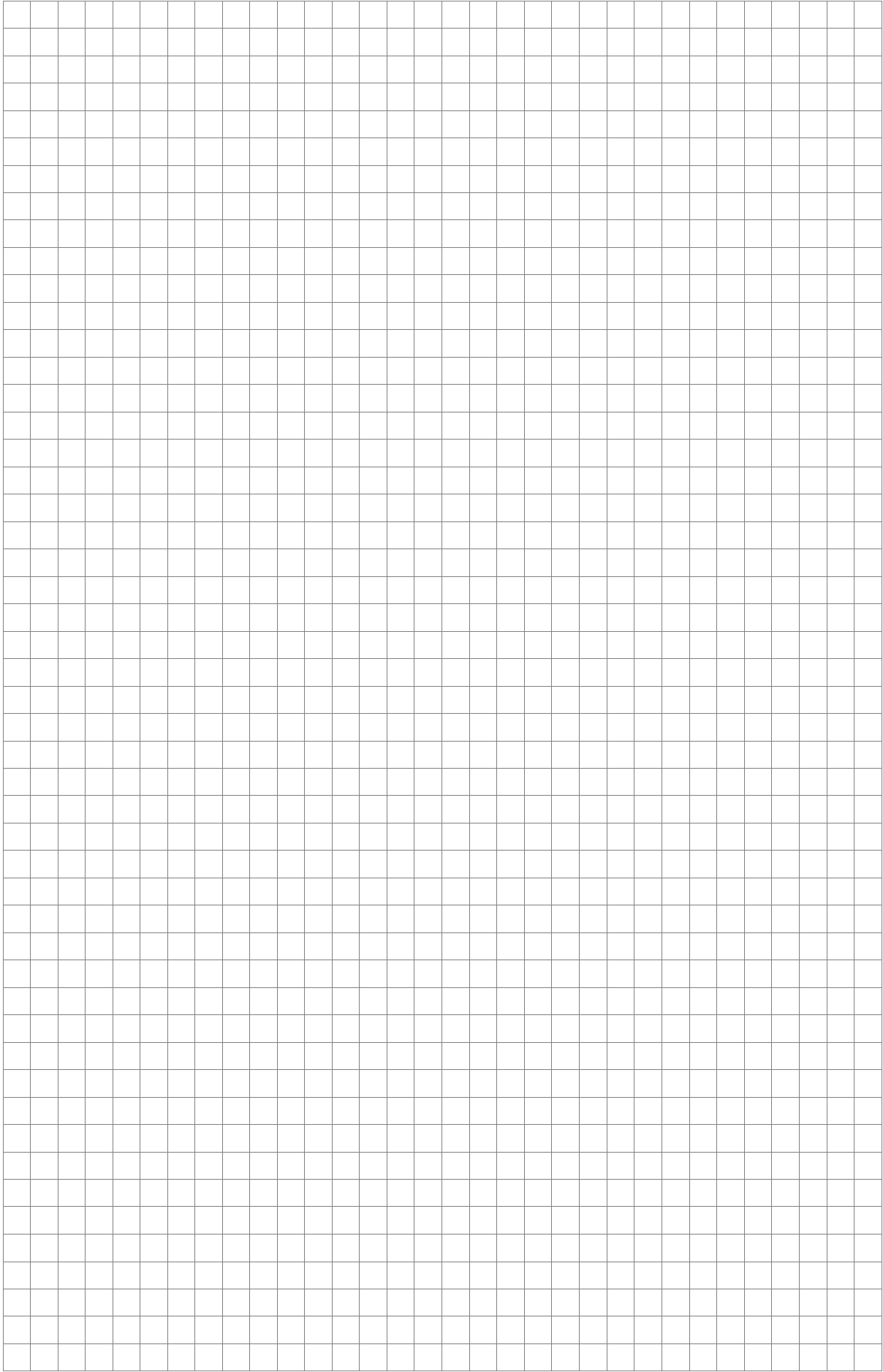
You will lose marks if all necessary work is not clearly shown.

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

Answers should be given in simplest form, where relevant.

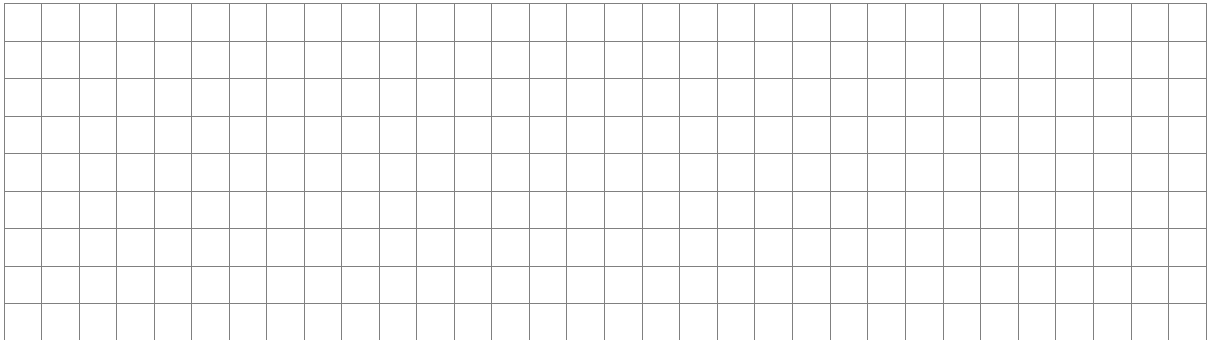
Write down the make and model of your calculator(s) here:

(c) Find the equations of both lines given that they both contain the point $(1, 5)$.

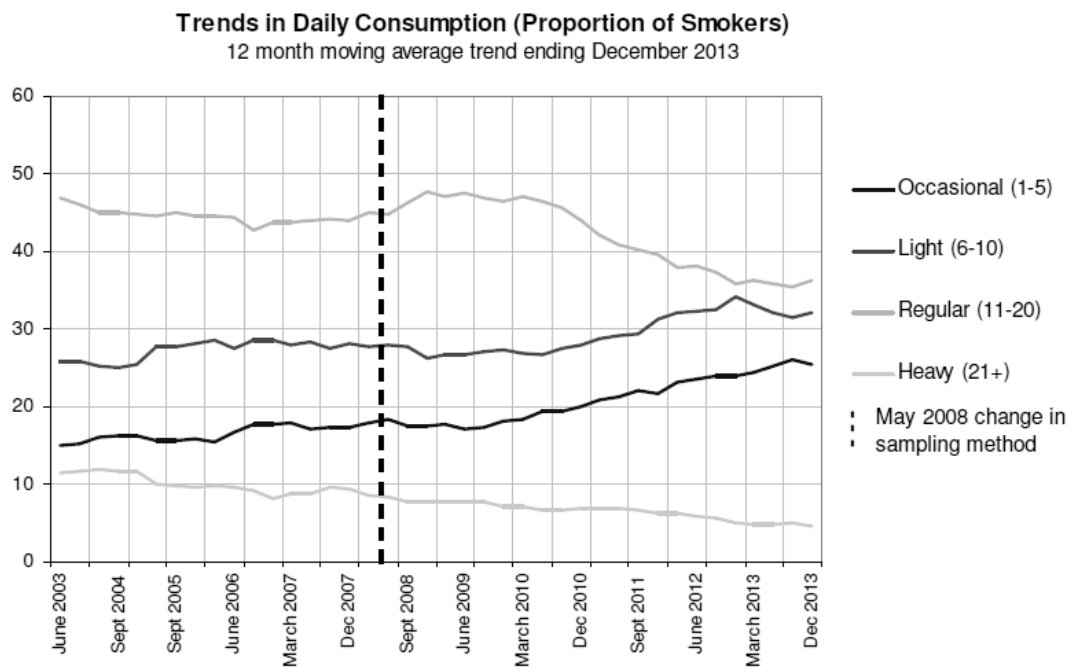


75% of the non-smokers having never smoked. 50% of those who have smoked are males.

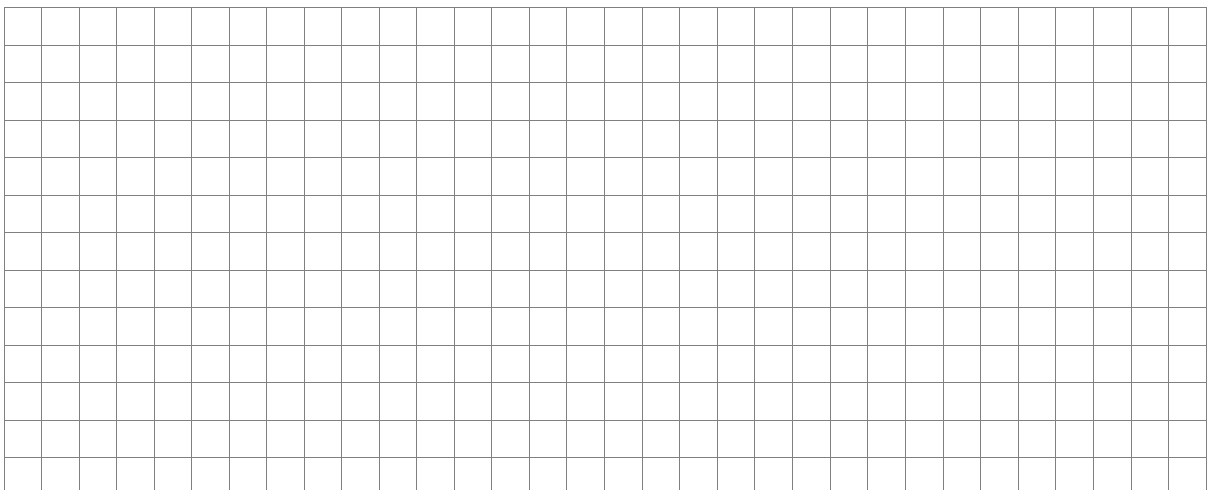
(c) How many females were smokers but have quit?



The smoking ban was introduced in Ireland in 2004. A government official claims that the numbers of smokers has fallen steadily since 2004 and are significantly lower now than in 2004.



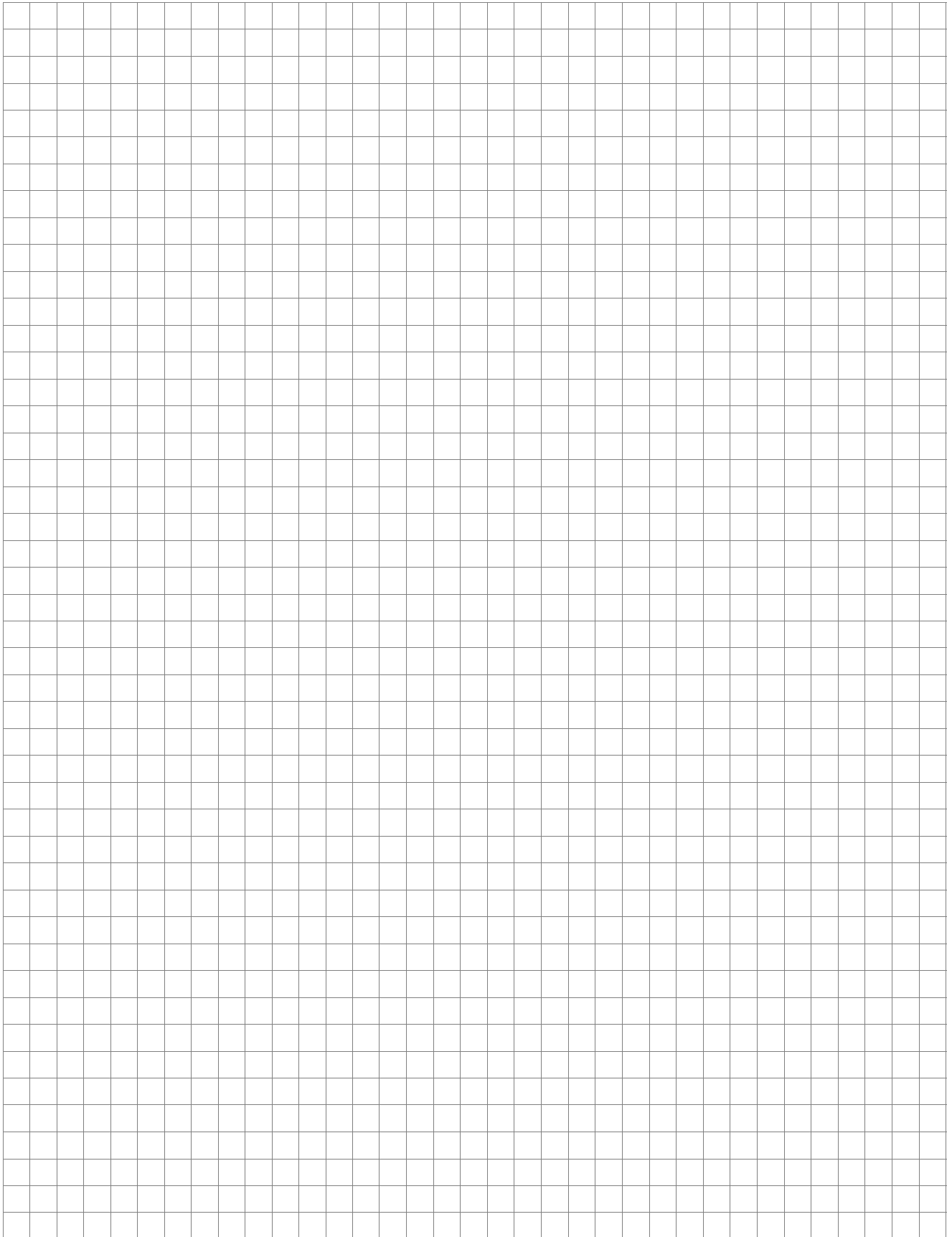
(d) Discuss validity of his claim.



Question 3

(25 marks)

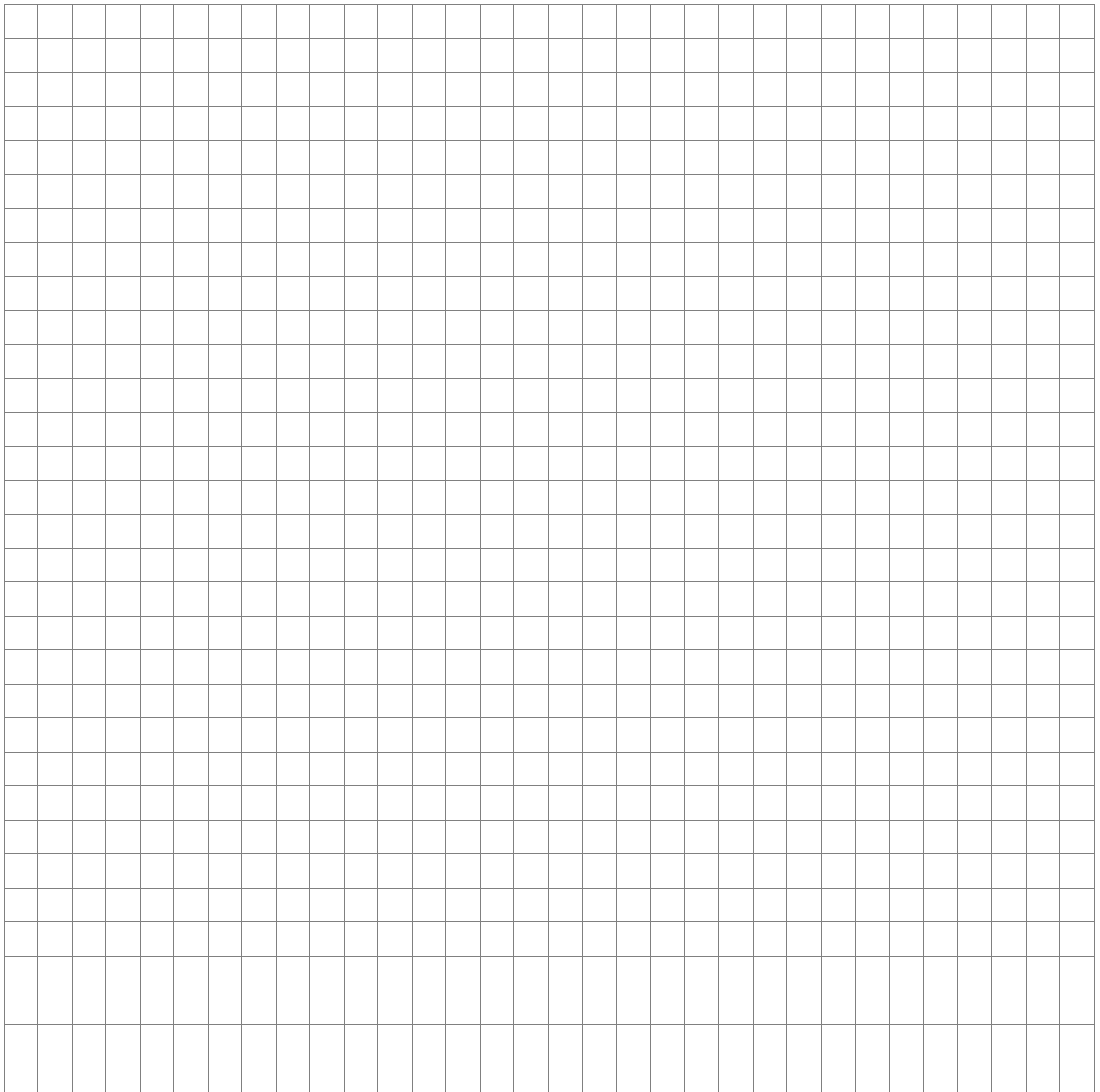
Find the equation of a circle which contains the points $(-3, 5)$ and $(7, 11)$, and whose centre lies on the line $3x - 5y = -34$.



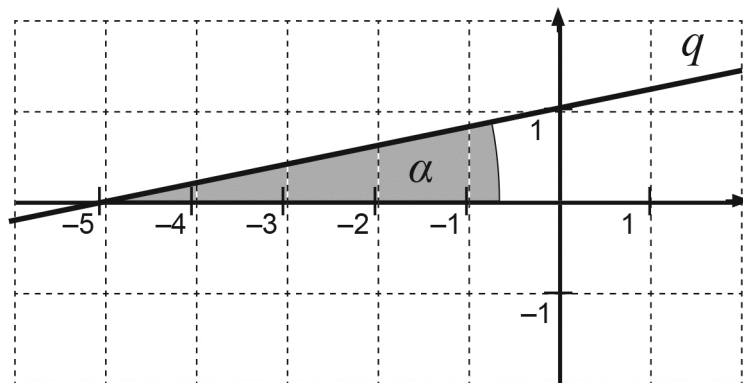
Question 5

(25 marks)

- (a) If $\sin A = -0.6293$ find two values of A , correct to the nearest degree, where $0^\circ \leq A \leq 360^\circ$.



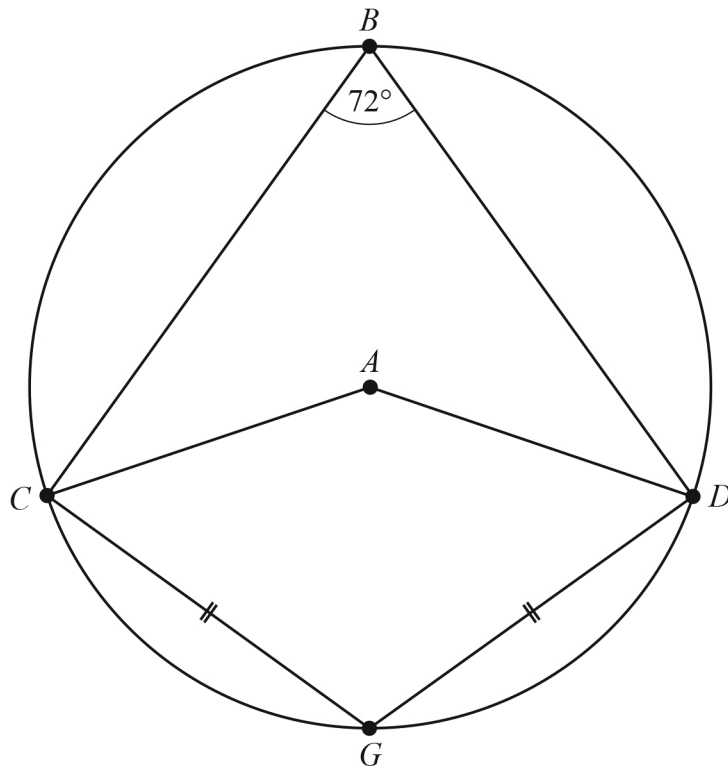
- (b) The line q makes an acute angle with the x -axis as shown.



- (i) Write down the slope of the line q .

- (ii) The line p makes an angle β with the x -axis such that $\tan(\alpha + \beta) = \frac{11}{3}$. Find the slope of the line p .

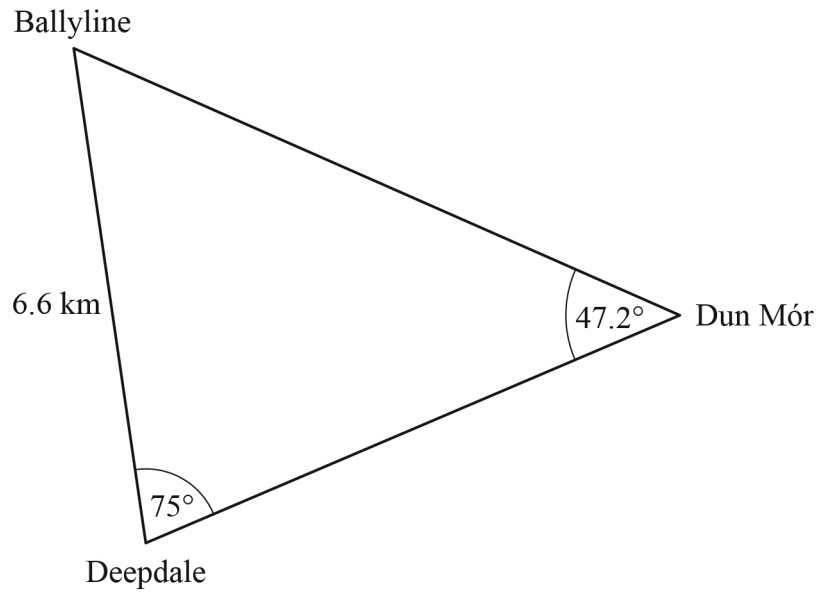
(b) Hence find $|\angle CGD|$.



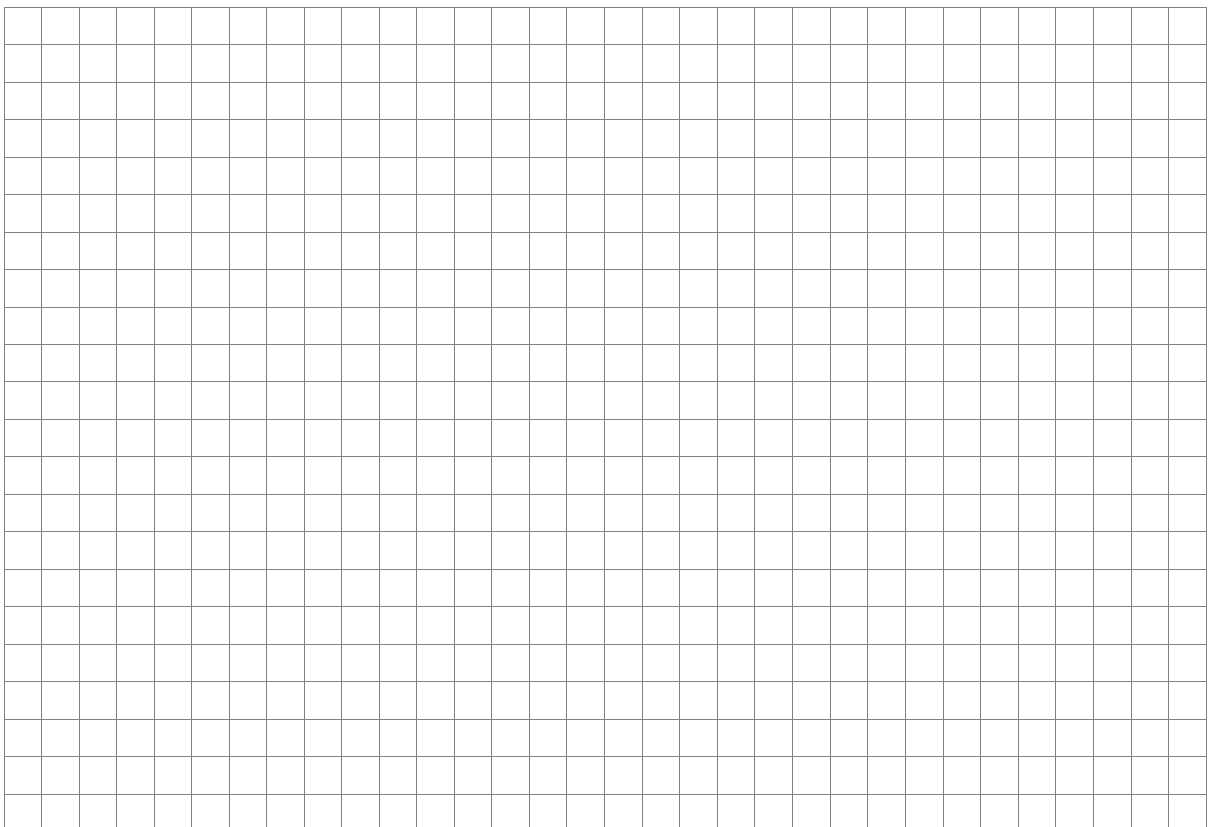
Answer **all three** questions from this section.

Question 7**(70 marks)**

Three towns are situated as shown

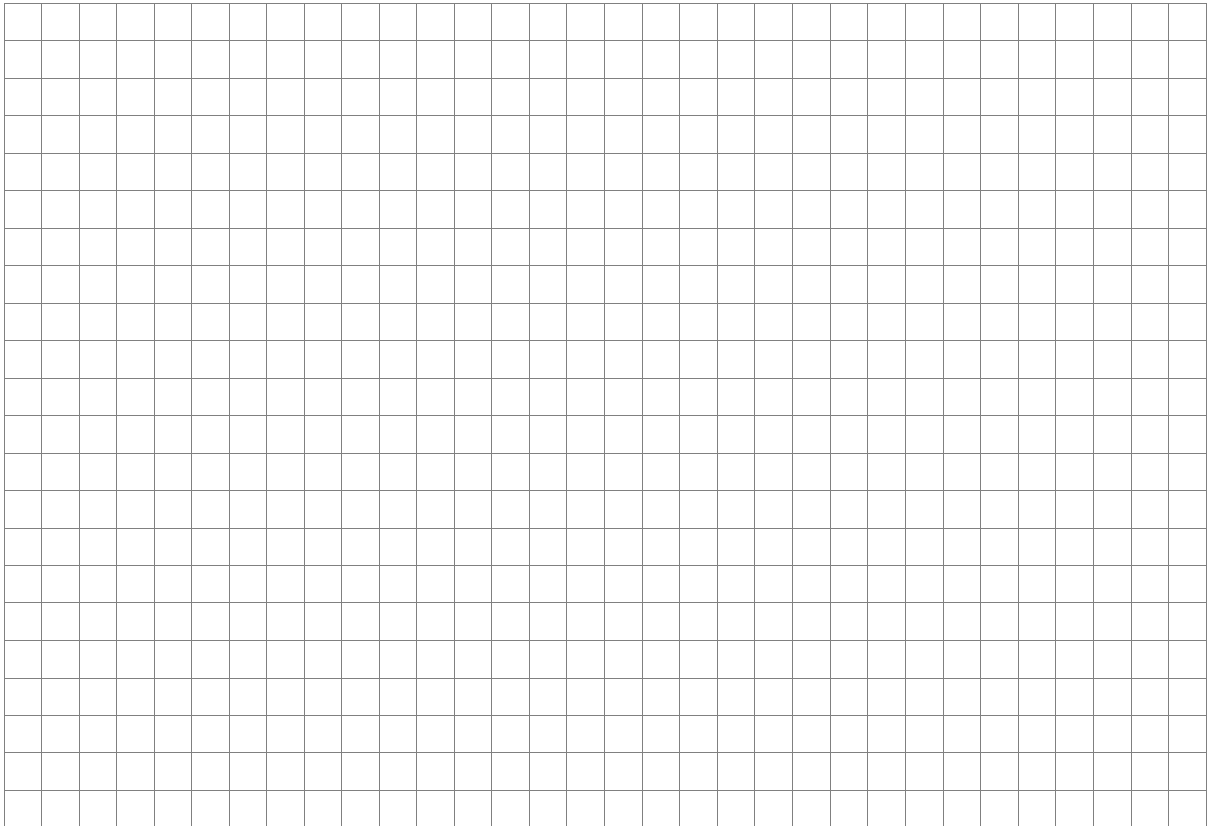


- (a) Calculate the distance from Ballyline to Dun Mór correct to one decimal place.



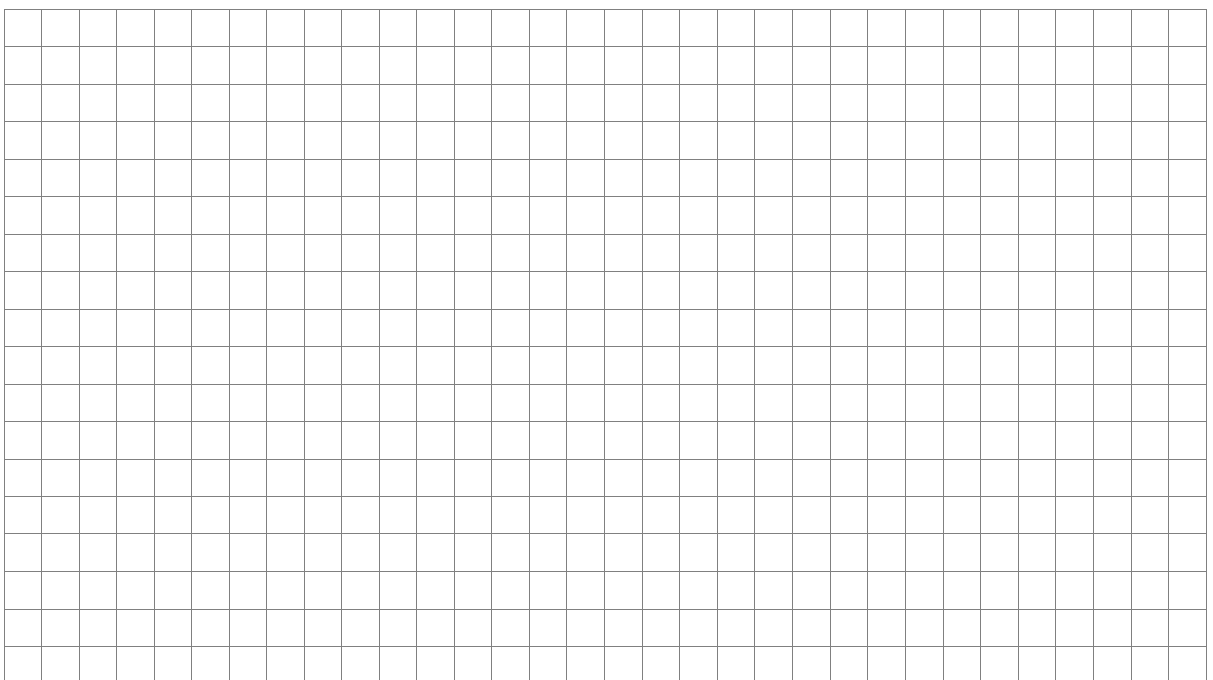
Due to the installation of water meters the road from Ballyline to Dun Mór will be closed for a week. Traffic will be diverted via Deepdale.

- (b) Calculate the percentage increase in the distance motorists will have to travel due to the diversion if travelling from Ballyline to Dun Mór via Deepdale.

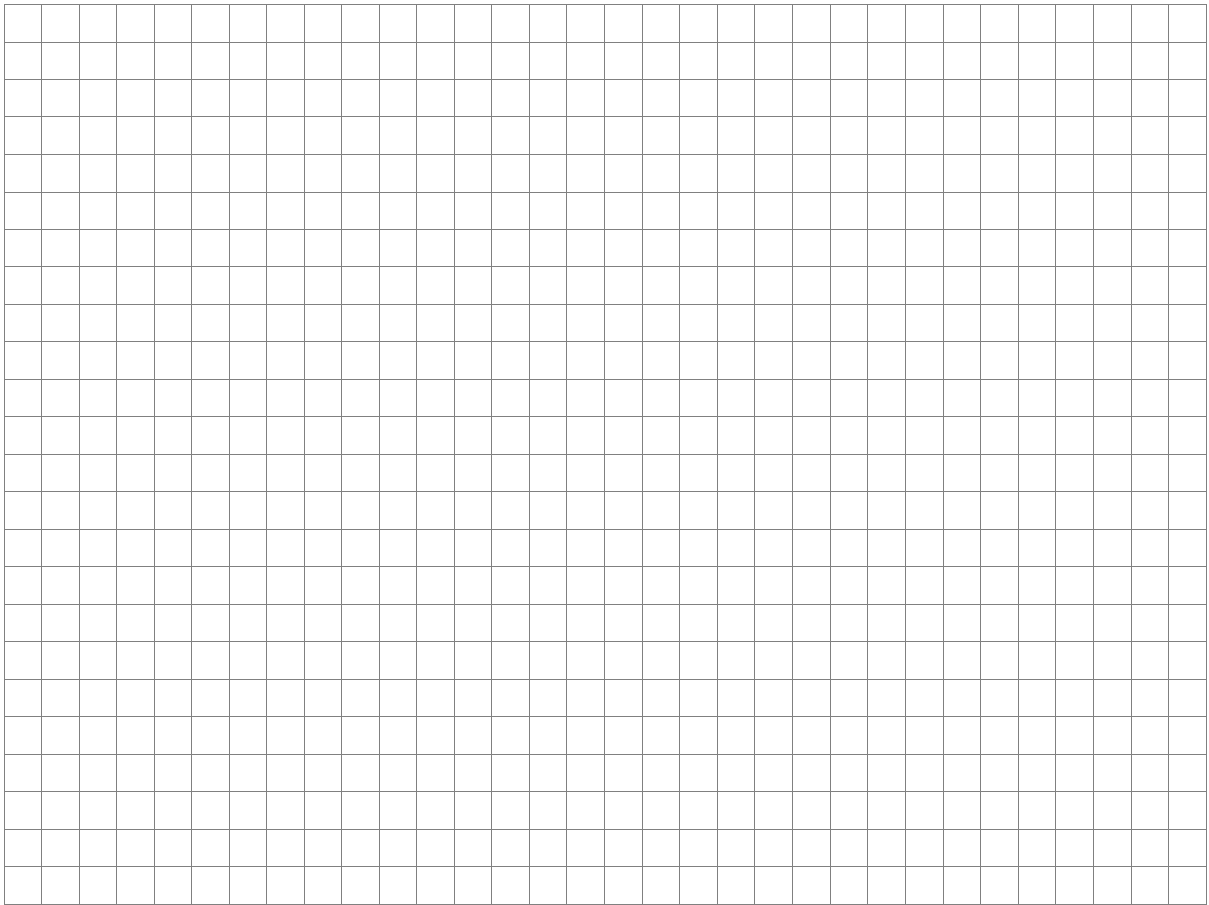


Each town will receive its water from a central reservoir after the water meters are installed. The reservoir will be equidistance from each town.

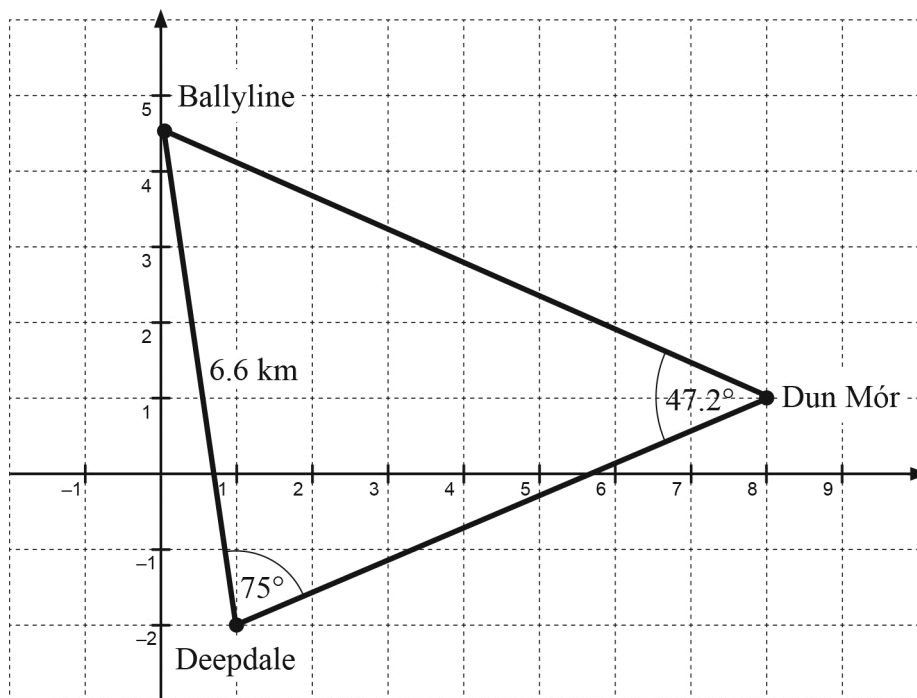
- (c) What name is given to the point equidistance from the three vertices of a triangle?



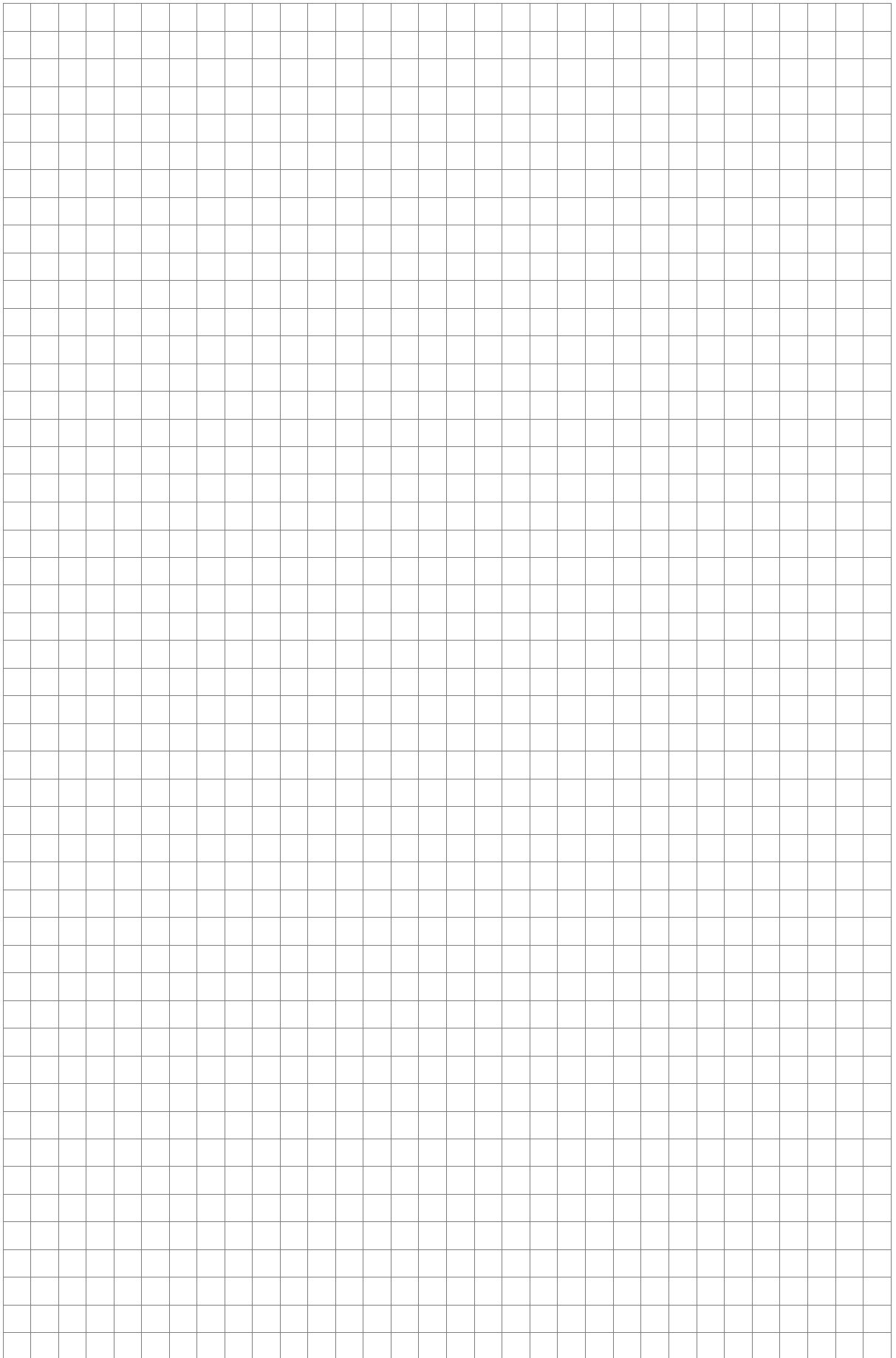
- (d) Using a suitable construction show where the reservoir will be situated on the diagram above.
- (e) Taking a scale of 1 cm : 2 km, estimate the shortest distance from the reservoir to each town.



The county planning officer decides to double check the above information by overlapping the information with a coordinate plane.



- (f) By choosing $(0.1, 4.5)$ as coordinates for Ballyline find the coordinates of the reservoir and verify your answer from part (e).



Question 8

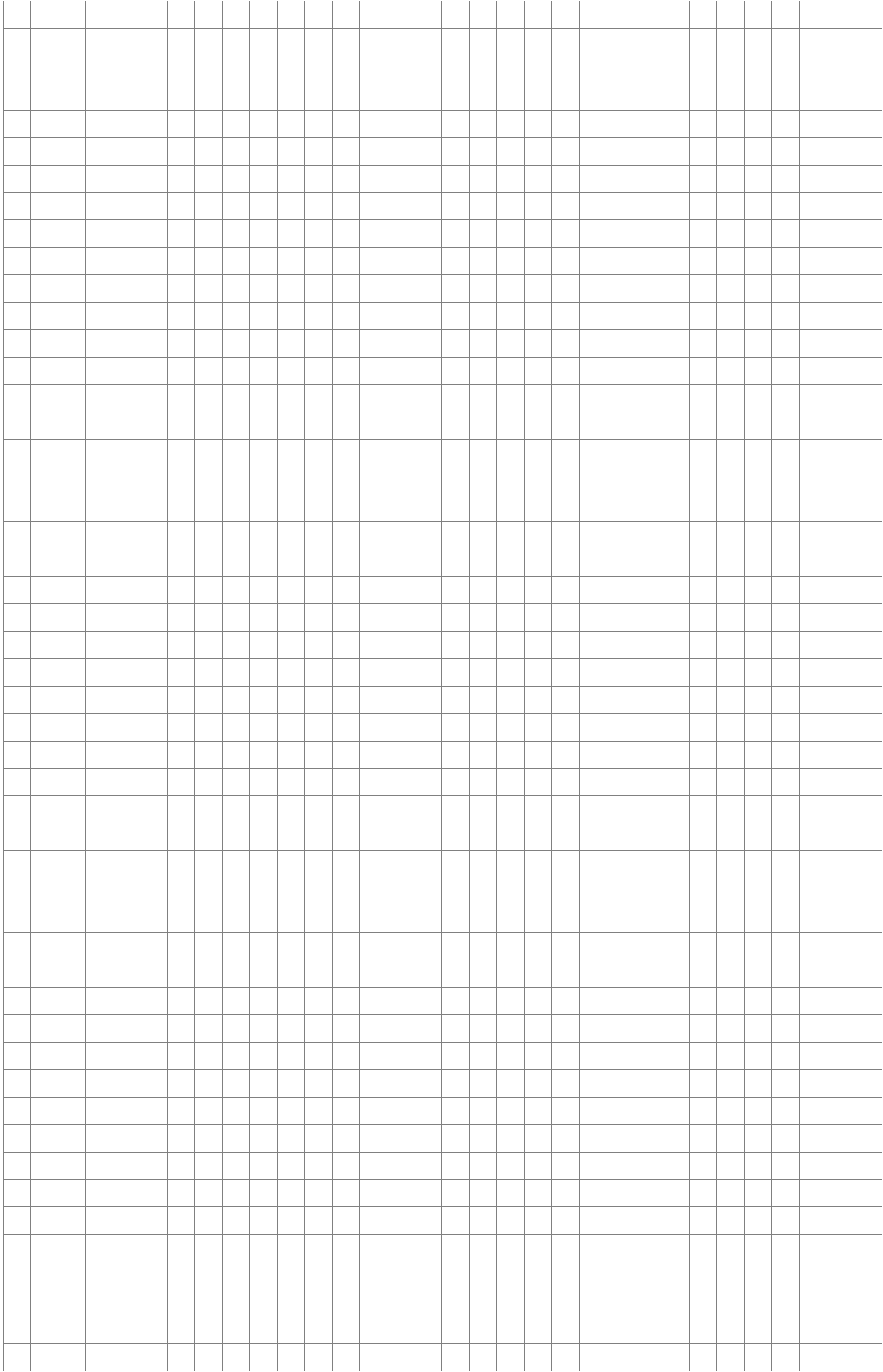
(55 marks)

(a) A light bulb manufacturer claims that the lengths of the life of its bulbs have a mean of 16 months and a standard deviation of 3 months. An independent research company tests a random sample of 60 bulbs to investigate the companies claim.

(i) Calculate an approximate value for the standard deviation of the sample means.

(ii) Assuming the company's claim is true, what is the probability that the research company's sample has a mean life of 15 months or less?

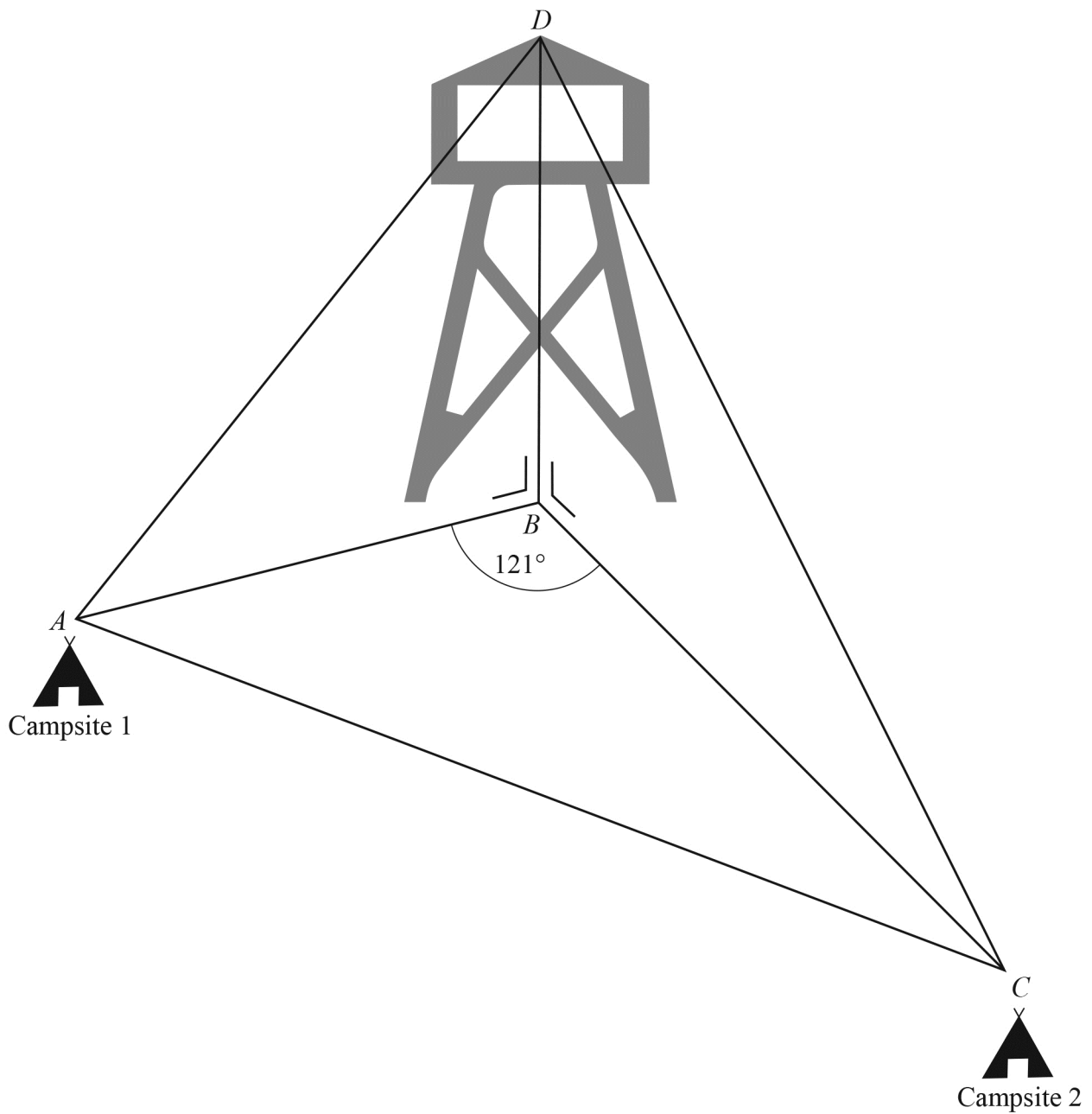
(iii) Use a hypothesis test to investigate the company's claim?



Question 9

(25 marks)

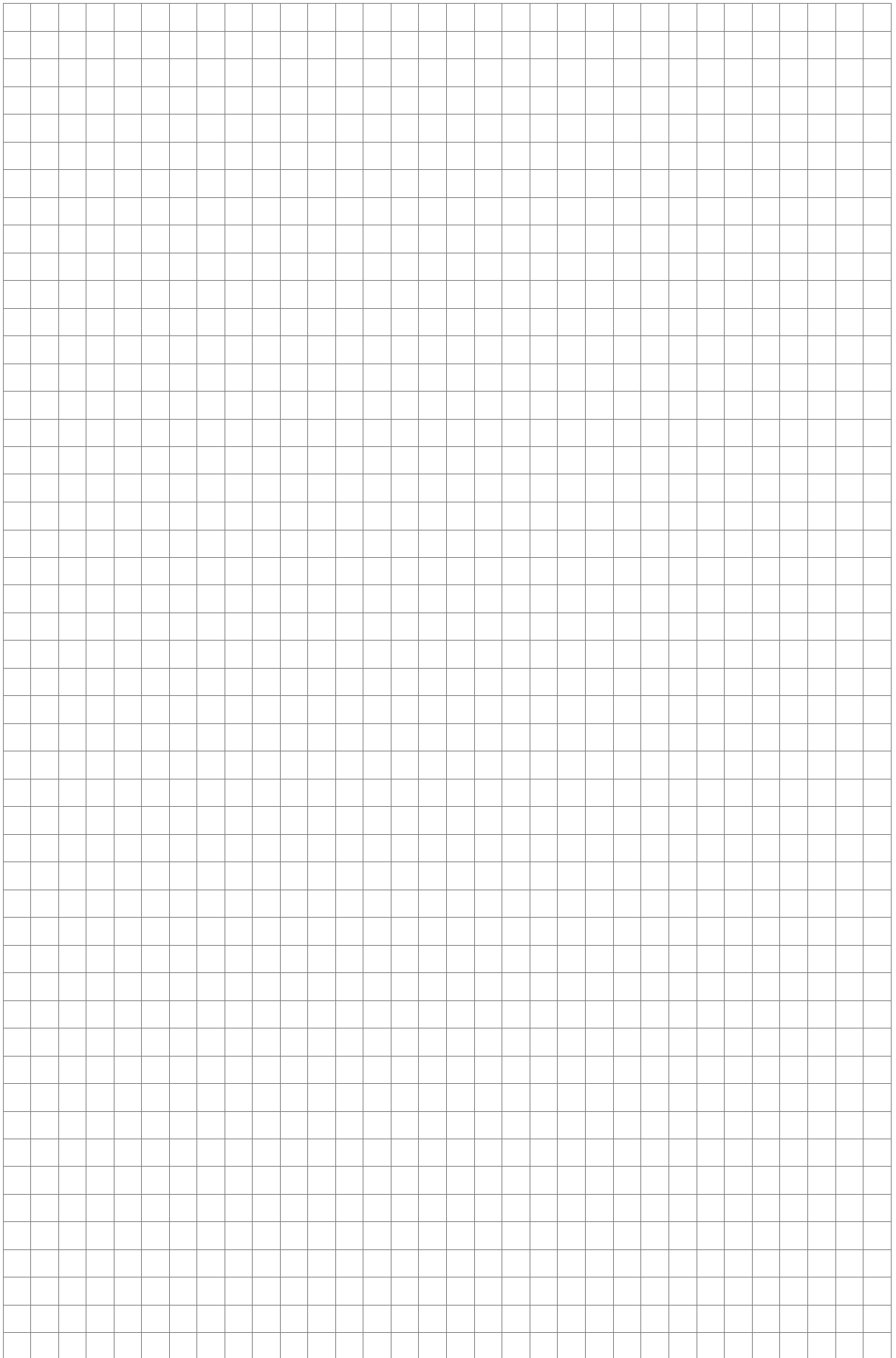
A ranger in a forest can view two campsites from the top of the lookout tower which is 60 m high. The angle of depression to Campsite 1 is 37.3° while the angle of depression with Campsite 2 is 18.4° .



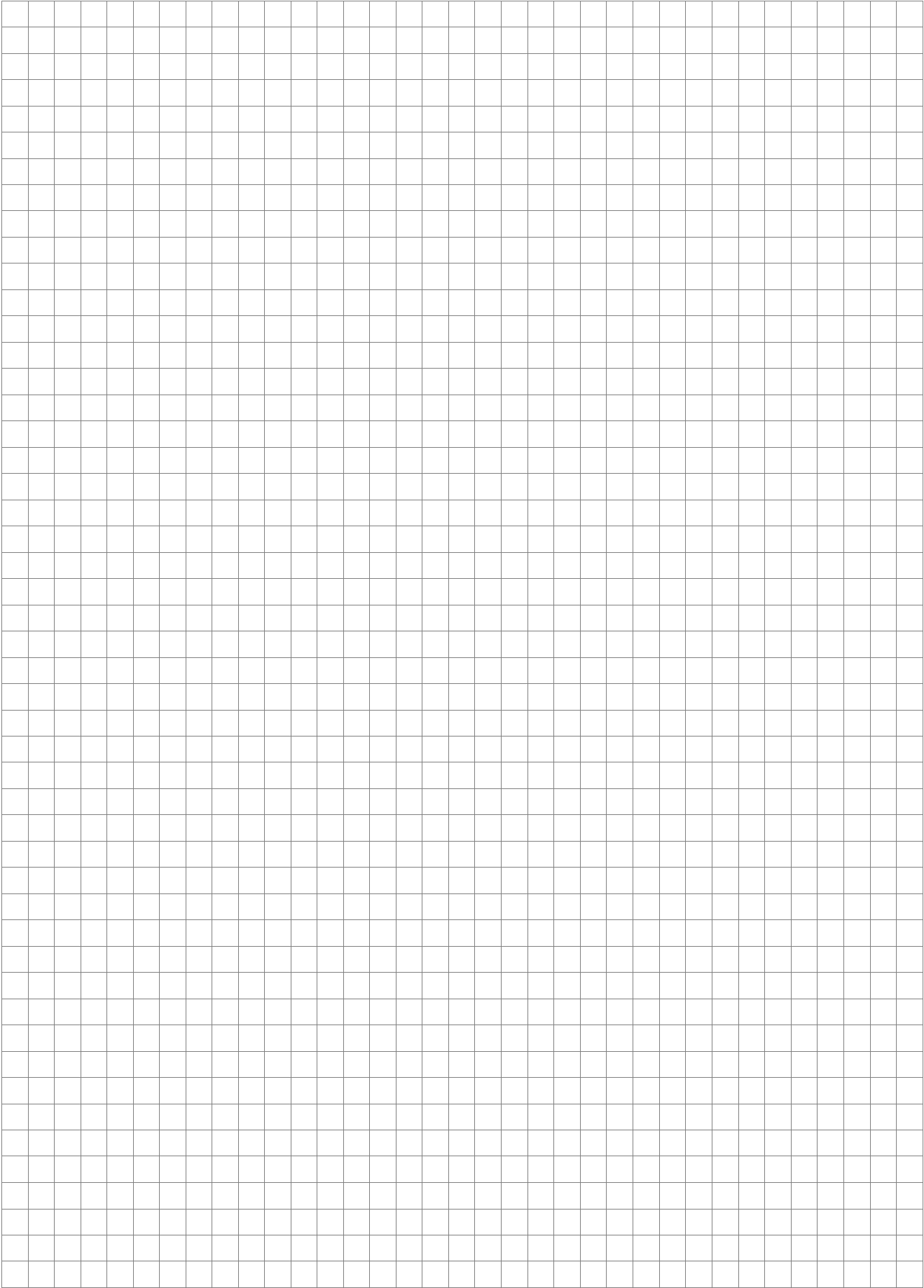
- (a) Calculate the distance from the bottom of the tower to each campsite correct to one decimal place.



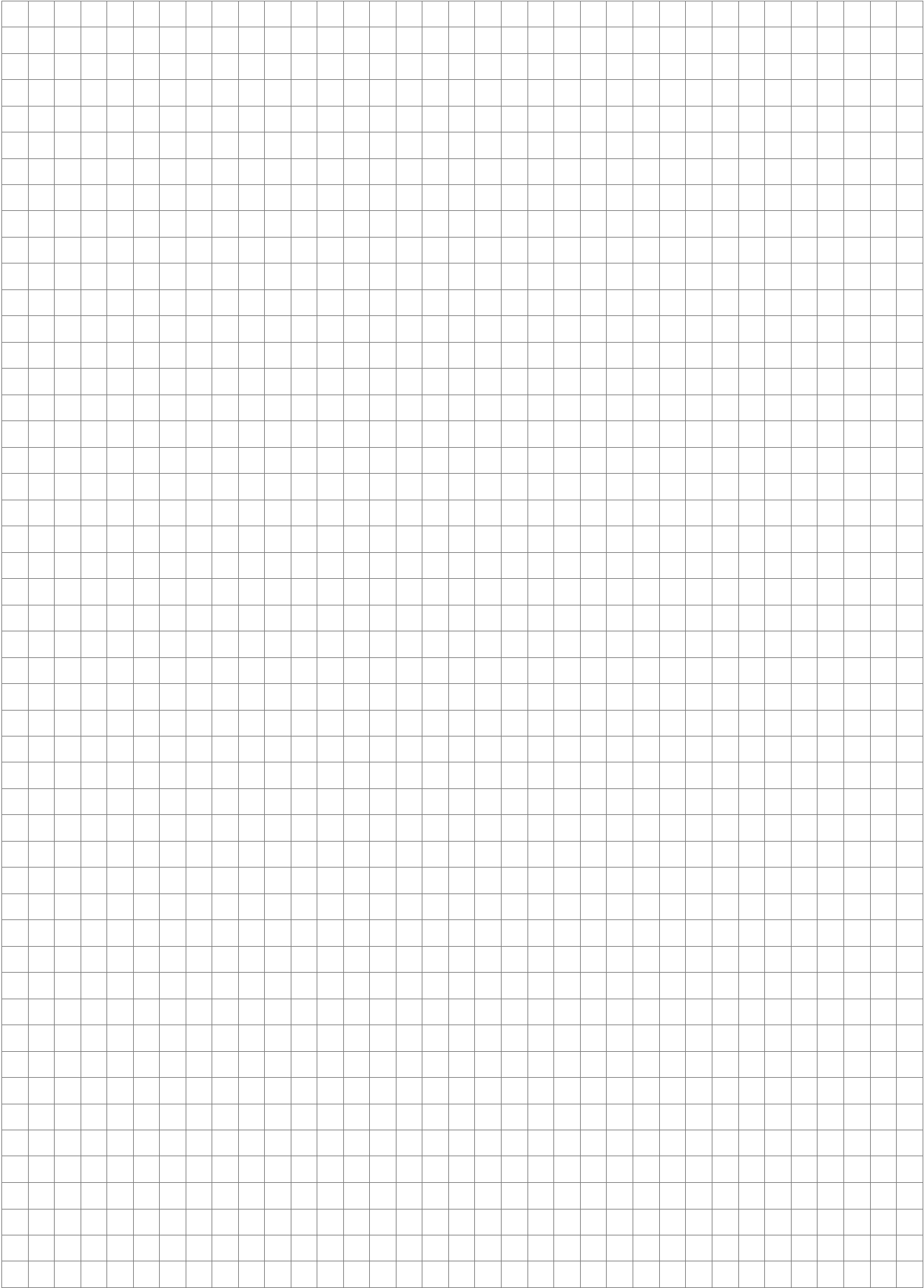
- (b) It is intended to open a walking trail that extends through each campsite. Calculate the distance from Campsite 1 to Campsite 2 correct to one decimal place.



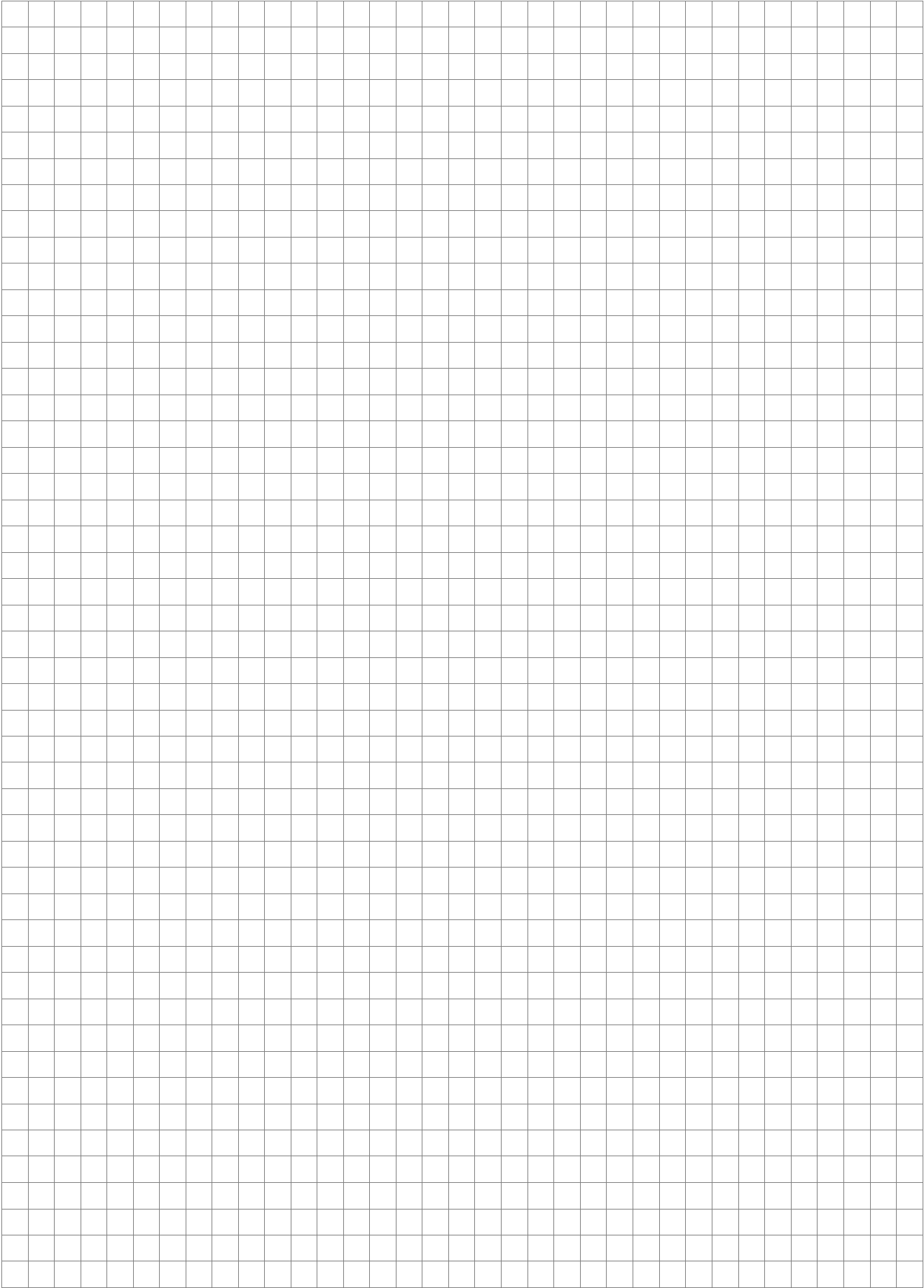
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