



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination
Sample Paper

Mathematics

(Project Maths – Phase 2)

Paper 2

Ordinary Level

Time: 2 hours

300 marks

Examination number

Centre stamp

Running total	
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For examiner			
Question	Mark	Question	Mark
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7			
8			
9			
10		Total	

Grade

Instructions

There are 16 questions on this examination paper. Answer **all** questions.

Questions do not necessarily carry equal marks.

Write your answers in the spaces provided in this booklet. 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 booklet of *Formulae and Tables*. 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.

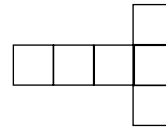
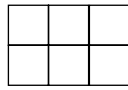
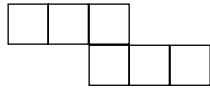
Answers should be given in simplest form, where relevant.

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

Question 1

(Suggested maximum time: 2 minutes)

Some of the nets below can be folded to form a cube. Draw a circle around any net that can form a cube in this way.



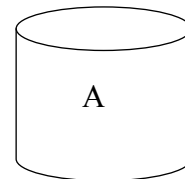
Question 2

(Suggested maximum time: 10 minutes)

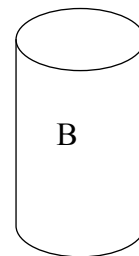
A food production company has to decide between two closed cylindrical tins A or B to hold a fruit they are marketing for the first time. Both tins have the same volume.



- (a) Tin A has a radius of 4 cm and a height of 8 cm. Find the volume of tin A.



- (b) The radius of tin B is 3.5 cm. Use the volume you got in (a) above to find the height of tin B. Give your answer correct to one place of decimals.



- (c) Which one of the above tins do you think the company might choose? Give a reason for your answer.

Tin: _____

Reason: _____

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Question 5**(Suggested maximum time: 10 minutes)**

The following question was asked on the phase 9 *CensusAtSchool* questionnaire:

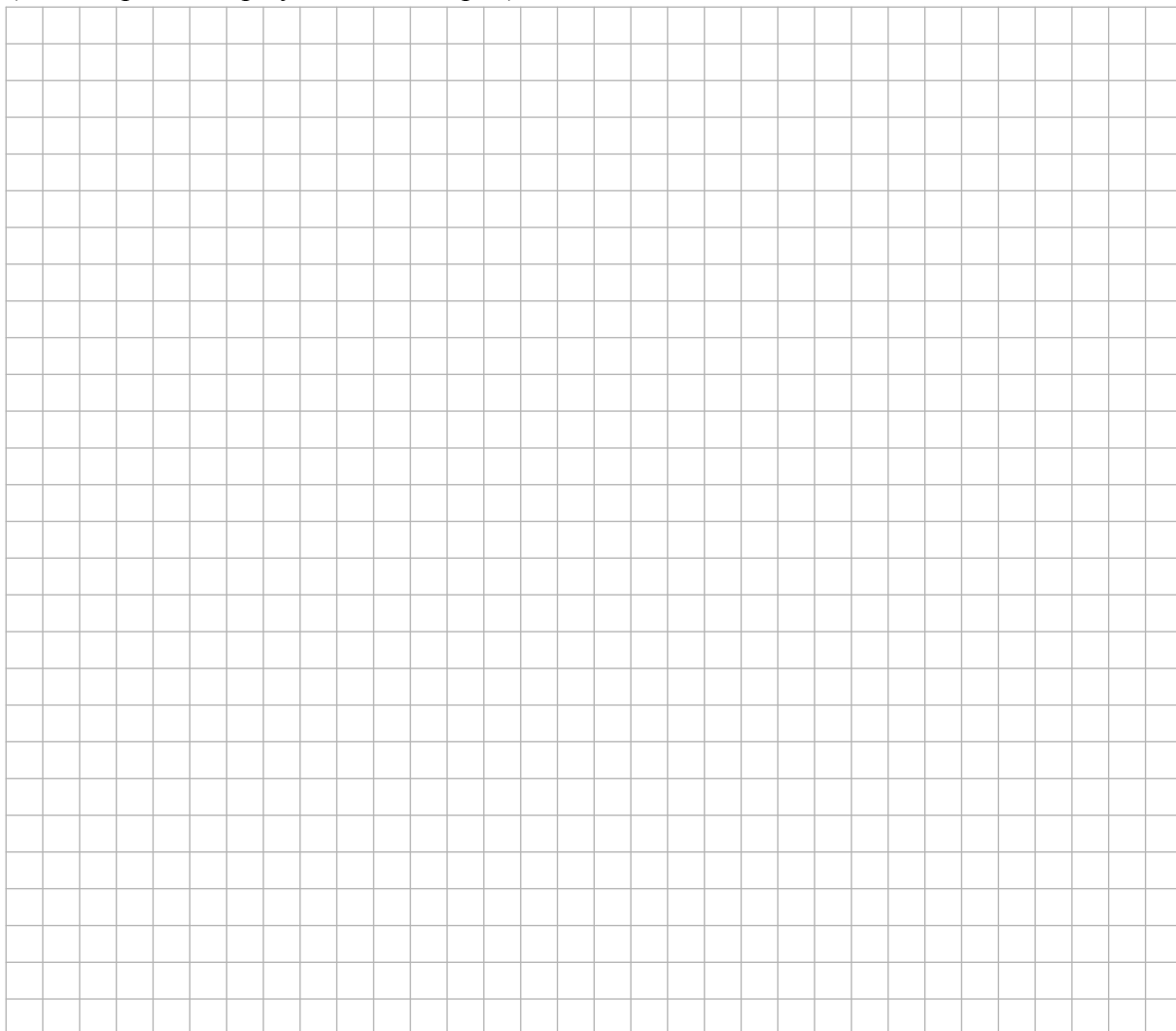
“Approximately how many hours per week do you spend on social networking sites?”

The data below are from two samples of students chosen at random from the UK and Ireland.

Number of hours	UK Number of students	Ireland Number of students
1		
2	1	1
3	2	3
4	1	2
5	2	2
6	7	2
7		3
8		
9	1	5
10		2
11		3
12		3
13	4	4
14	1	2
15	5	
16	5	5
17	2	1
18	4	2
19	5	4
20	3	2
21	2	
22	3	
23	1	
24		
25	1	4

(a) How many students are in each sample? UK _____ Ireland _____

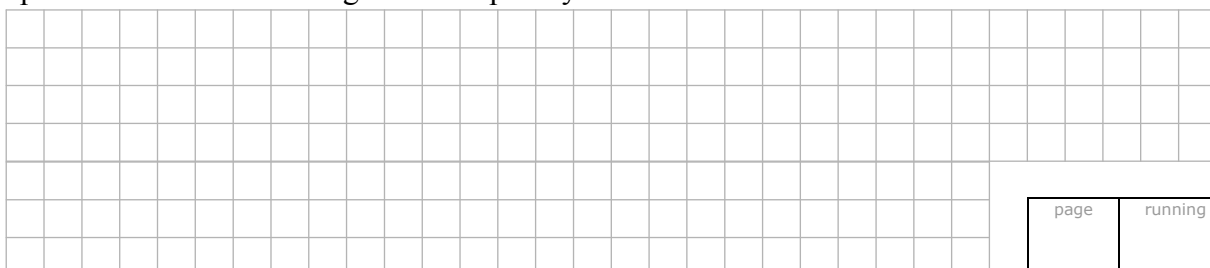
- (b)** Display the data in a way that allows you to compare the two samples.
(Use a separate display for each sample.)



- (c)** Based on your answer to part **(b)**, what similarities and differences are there between the two samples?



- (d)** Is it safe to say that there are differences between Irish and UK people regarding the time they spend on social networking sites? Explain your answer.



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Question 8

(Suggested maximum time: 5 minutes)

- (a) The mean of a list of five numbers is 8.
Write down two different lists of numbers for which the above statement is true.

List 1	
List 2	

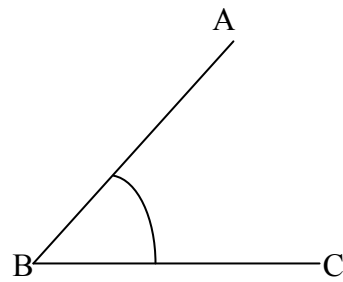
- (b) The mode of a list of six numbers is 7.
Write down two different lists of numbers for which the above statement is true.

List 1	
List 2	

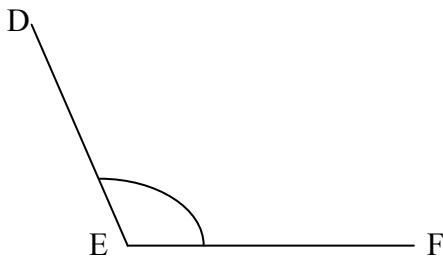
Question 9

(Suggested maximum time: 5 minutes)

- (a) Use a protractor to measure the angles $\angle ABC$ and $\angle DEF$.



$|\angle ABC| = \underline{\hspace{2cm}}$



$|\angle DEF| = \underline{\hspace{2cm}}$

- (b) The four angles $\angle M$, $\angle N$, $\angle O$ and $\angle P$ are shown in the diagrams below.



Starting with the smallest, put the four angles in order.

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Question 10

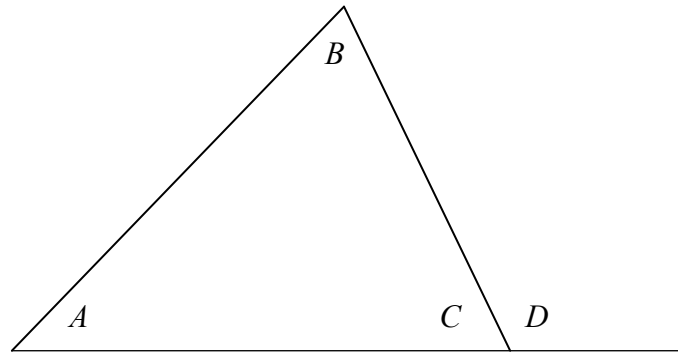
(Suggested maximum time: 10 minutes)

- (a) From the diagram opposite write down three angles which together add up to 180° .

$$\square + \square + \square = 180^\circ$$

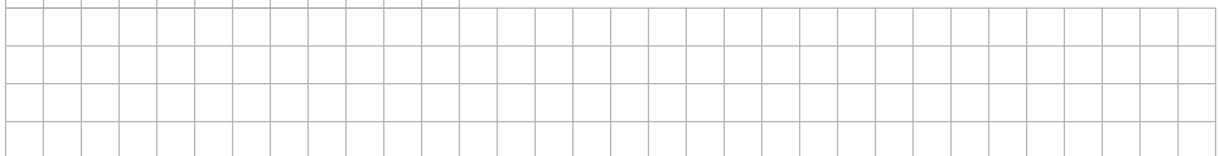
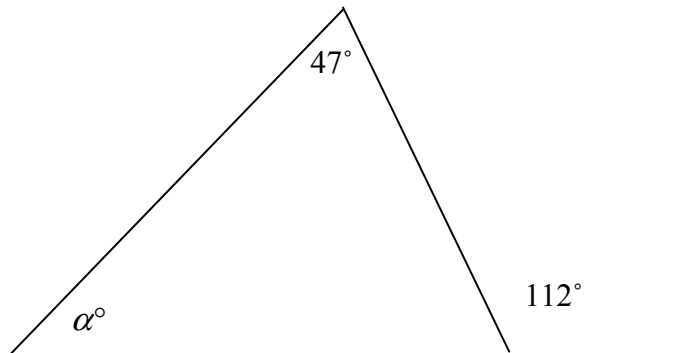
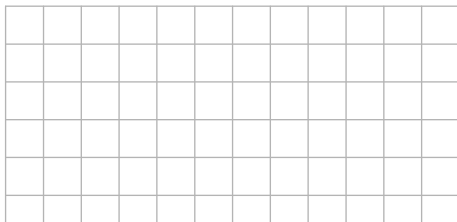
- (b) From the diagram opposite write down two angles which together add up to 180° .

$$\square + \square = 180^\circ$$



- (c) What can you conclude from your two statements about the relationship between $|\angle D|$ and $(|\angle A| + |\angle B|)$

- (d) Find α in the diagram.



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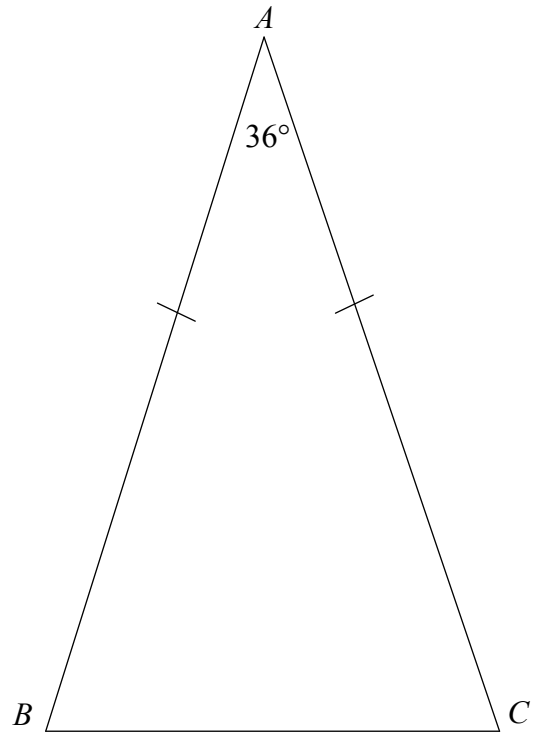
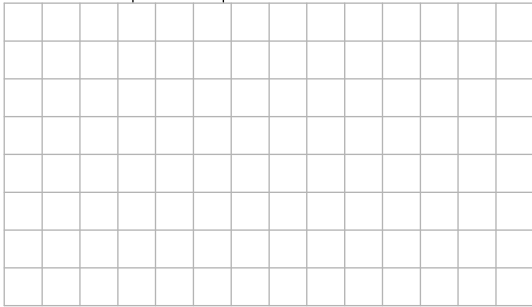
Question 11

(Suggested maximum time: 15 minutes)

The triangle ABC is isosceles.

$|\angle BAC| = 36^\circ$.

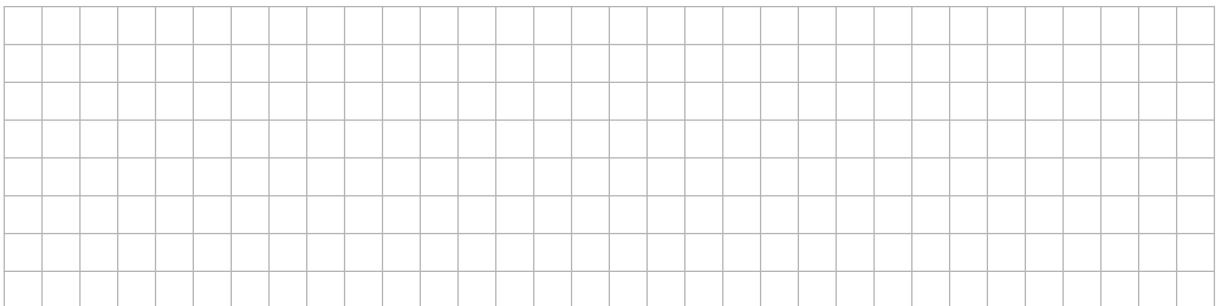
- (a) Calculate $|\angle ACB|$.



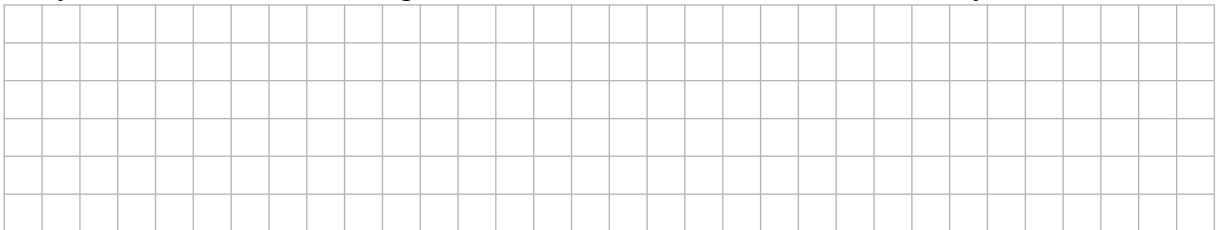
- (b) On the diagram construct the bisector of $\angle ABC$. Show all construction lines clearly.

- (c) Mark in the point D where your bisector meets the line AC .

- (d) Calculate all the angles in the triangle BDC and write them into the diagram.



- (e) Can you conclude that the triangle BDC is also isosceles? Give a reason for your answer.



- (e) Measure $|AC|$ and $|BC|$.

$|AC| = \underline{\hspace{2cm}} \text{ cm}$

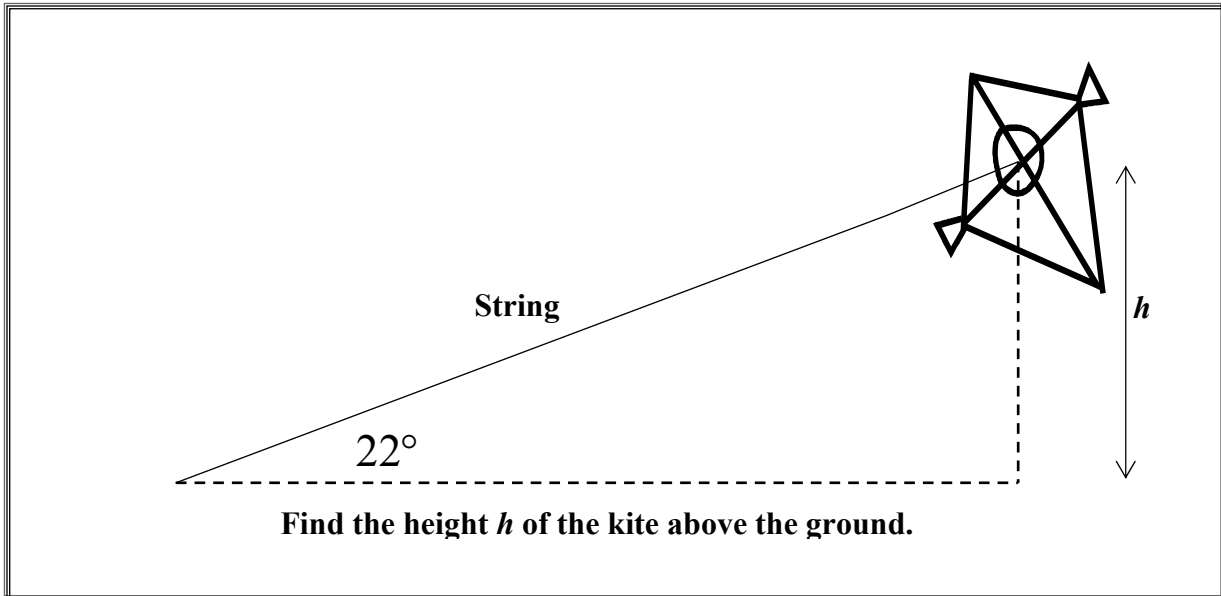
$|BC| = \underline{\hspace{2cm}} \text{ cm}$

- (f) Calculate the ratio $\frac{|AC|}{|BC|}$ correct to three places of decimals. $\frac{|AC|}{|BC|} = \underline{\hspace{2cm}}$

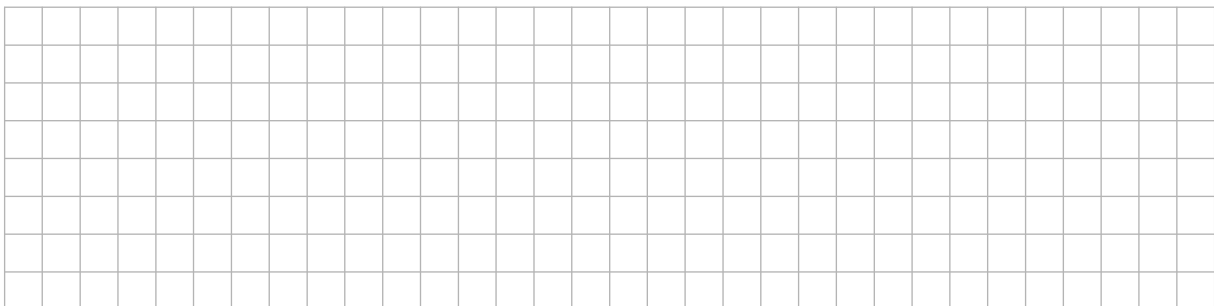
Question 13

(Suggested maximum time: 5 minutes)

Anne wanted to create a question which would use $\sin 22^\circ$ in its solution. She drew the diagram and wrote the question in the box below.



- (a) Anne has not enough information to answer the question. Put in an appropriate measurement on the diagram to complete it for her.
- (b) Using your measurement, find the height h in the diagram.

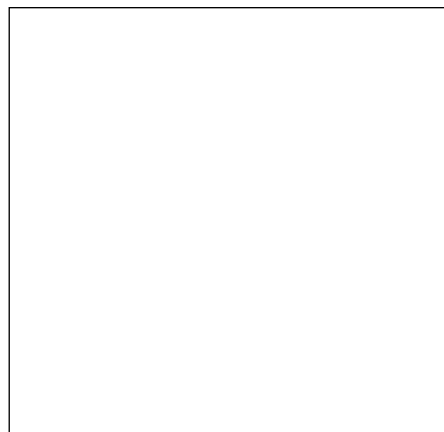


Question 14

(Suggested maximum time: 2 minutes)

The following diagram shows a square.

Draw in all its axes of symmetry.

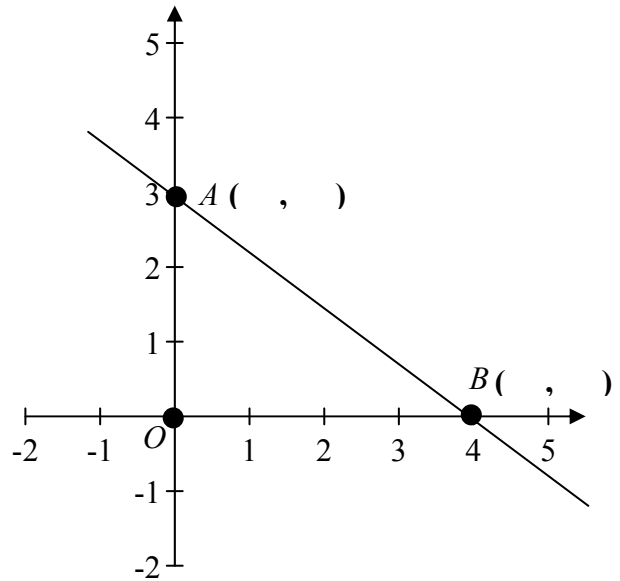
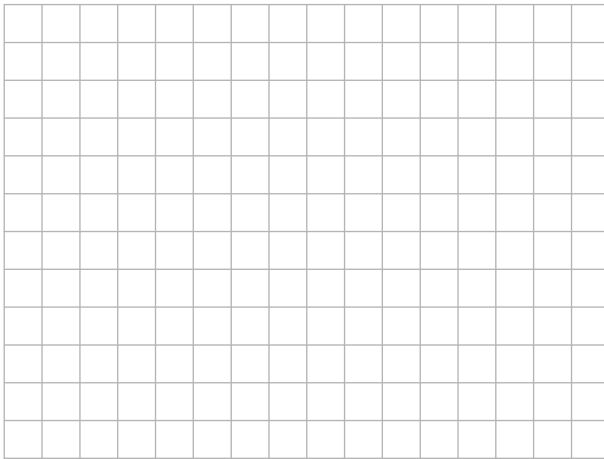


Question 15

(Suggested maximum time: 5 minutes)

(a) Write down the coordinates of the point A and the point B on the diagram.

(b) Use the distance formula to find $|AB|$

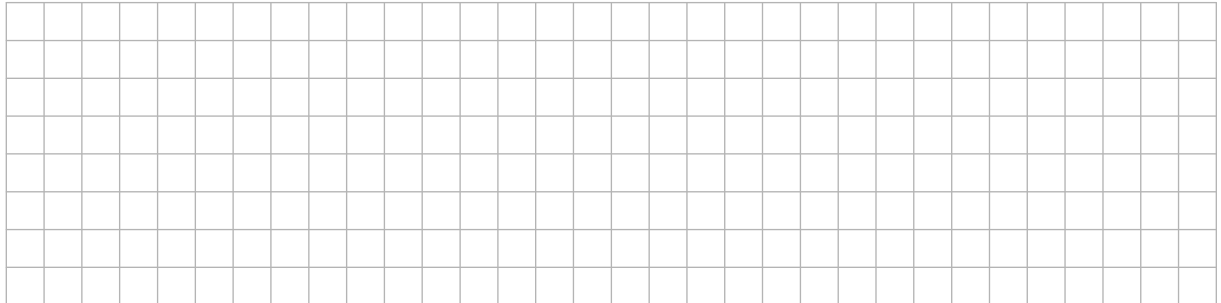


(c) Write down the distance from O to A and the distance from O to B .

$|OA| =$

$|OB| =$

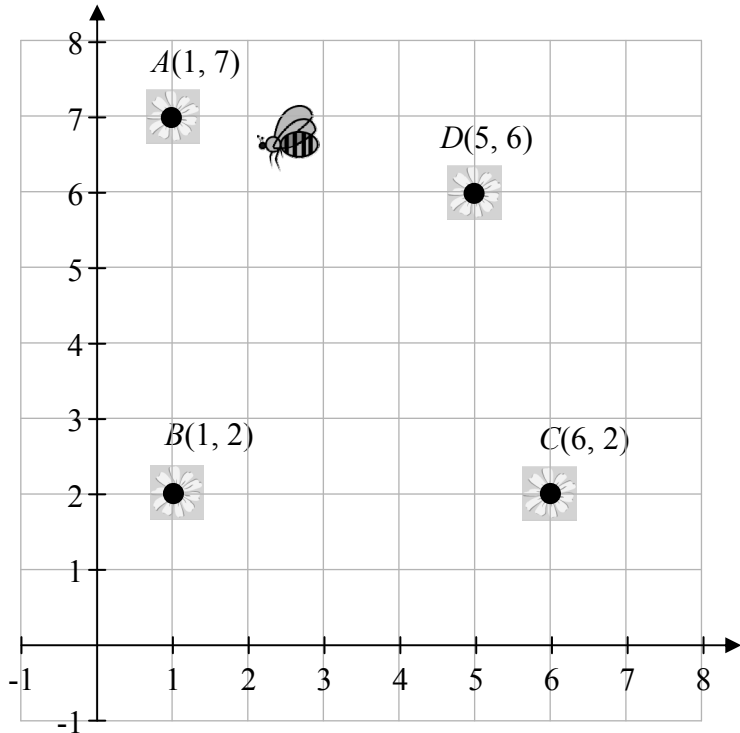
(d) Use the theorem of Pythagoras to find the length of the hypotenuse of the triangle OAB .



Question 16

(Suggested maximum time: 5 minutes)

A computer game shows the location of four flowers $A(1, 7)$, $B(1, 2)$, $C(6, 2)$, and $D(5, 6)$ on a grid. The object of the game is to collect all the nectar from the flowers in the shortest time.



- (a) A bee found a hidden flower half way between flower B and flower D . Find the coordinates of this hidden flower.

- (b) Another flower E can be located by completing the square $ABCE$. Write down the coordinates of the point E .

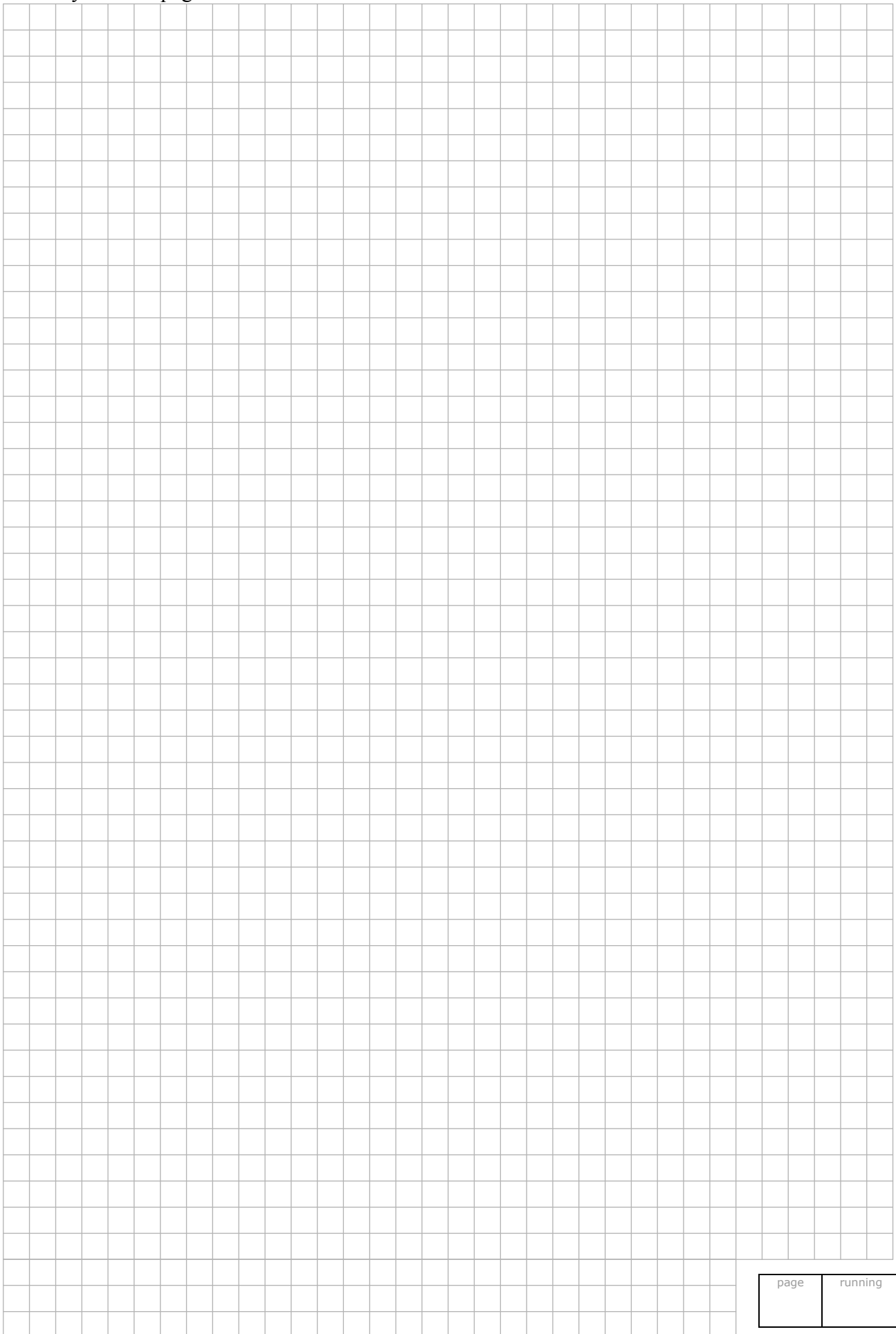
$E =$ _____

- (c) Bee 1 and Bee 2 are on flower A . Bee 1 flies directly from flower A to B and then on to C . Bee 2 flies from flower A directly to D and then on to C . Write down which bee has travelled the shortest distance giving a reason for your answer.

Answer: _____

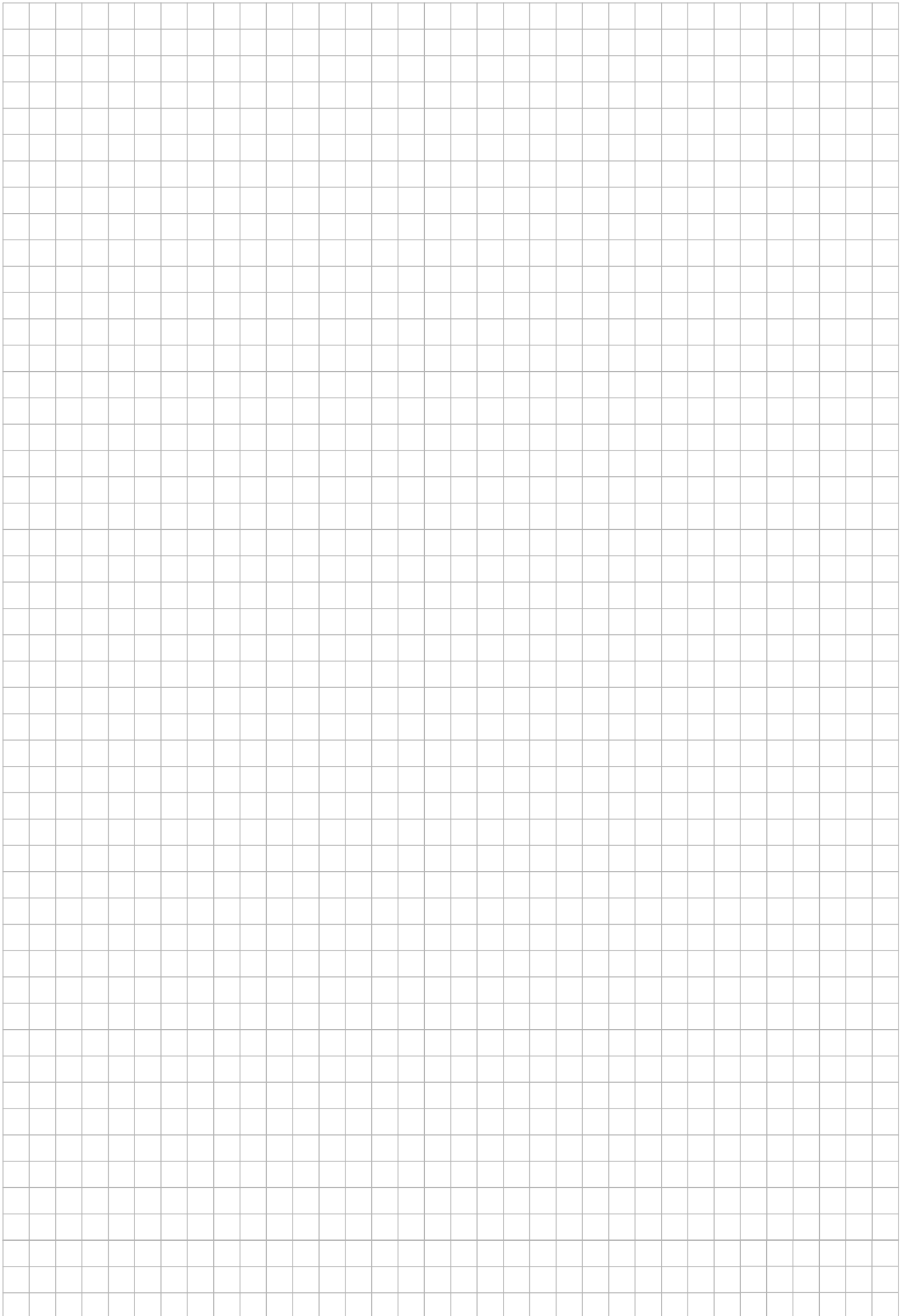
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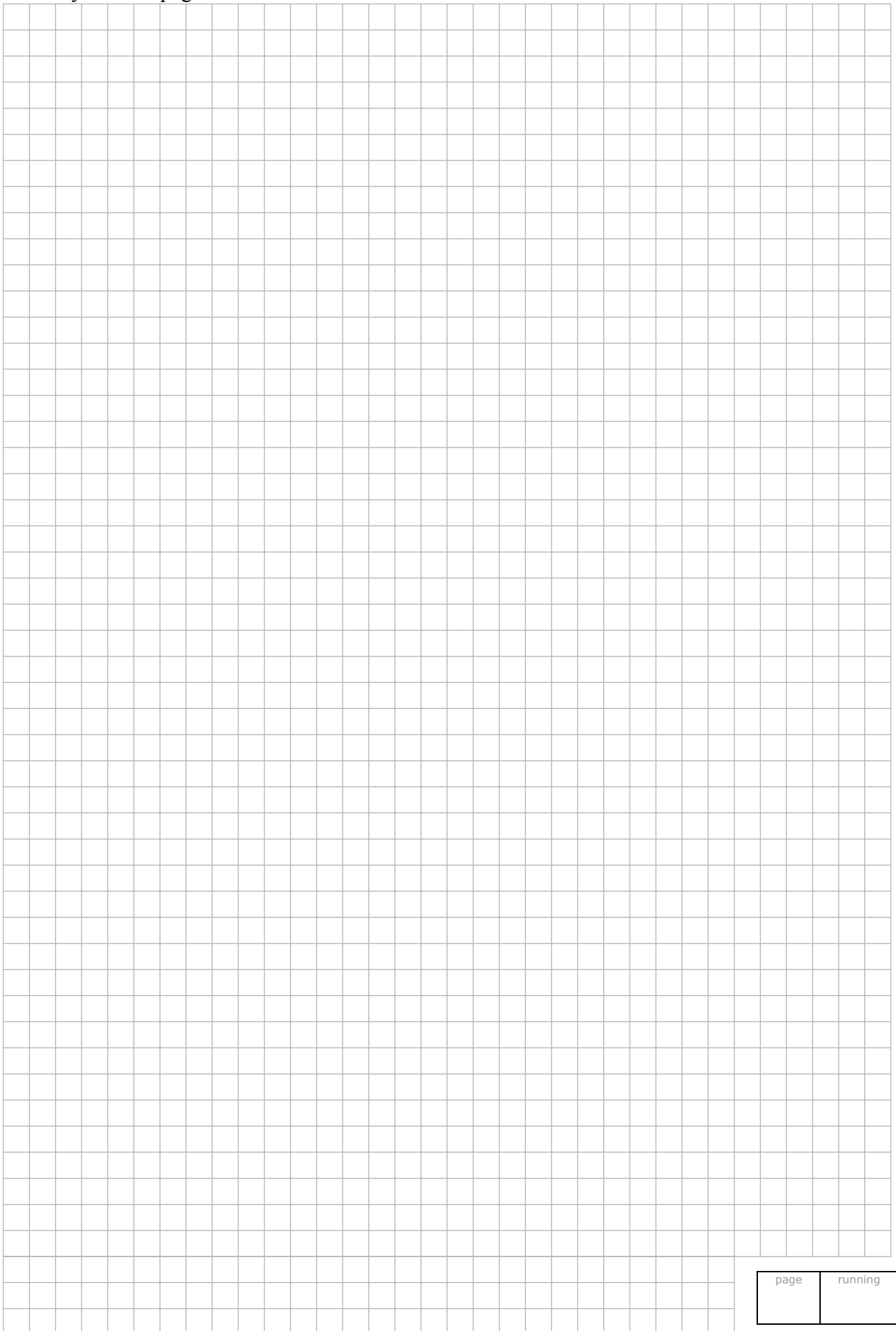


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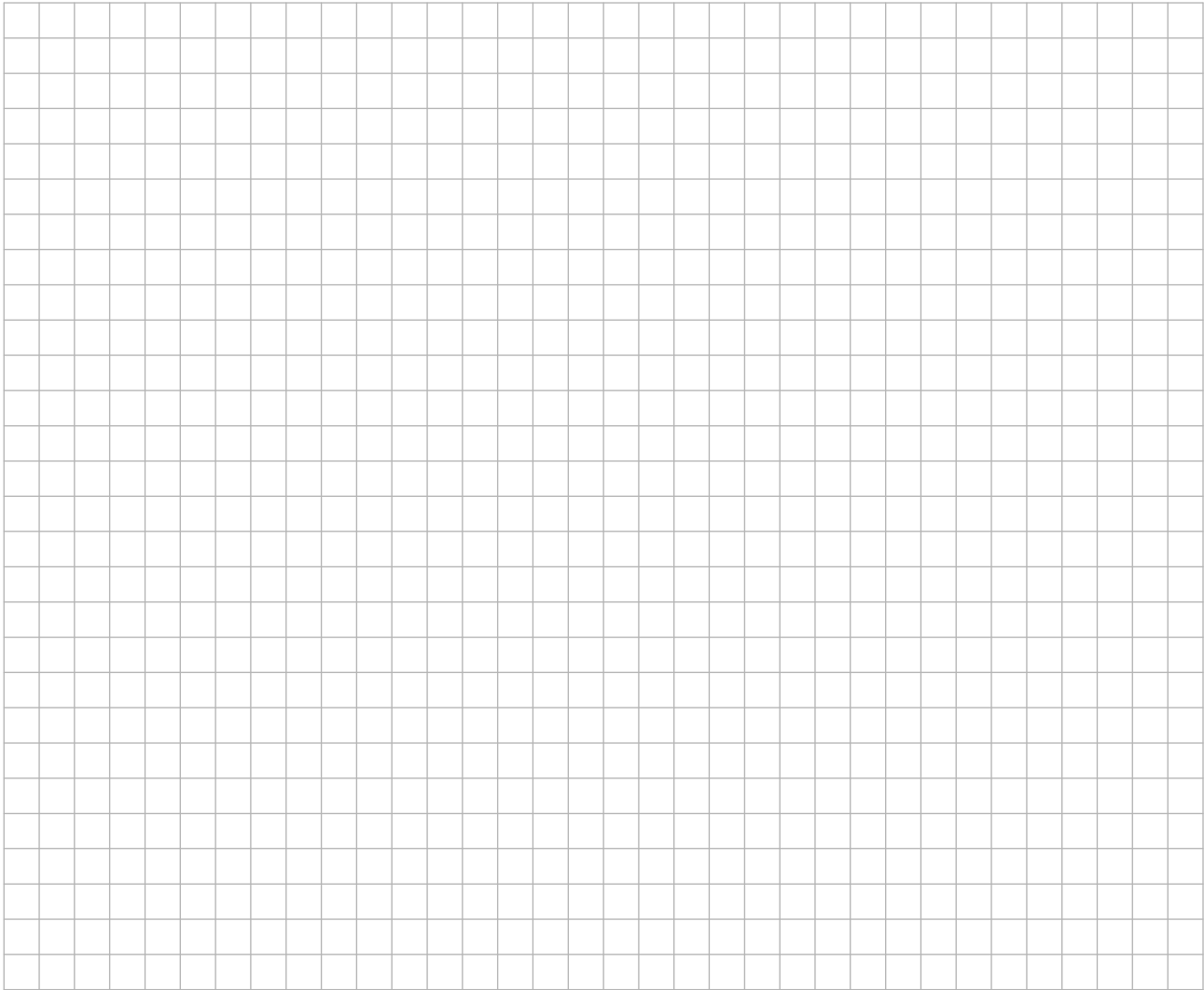
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Note to readers of this document:

This sample paper is intended to help teachers and candidates prepare for the June 2012 examination in the *Project Maths* initial schools. The content and structure do not necessarily reflect the 2013 or subsequent examinations in the initial schools or in all other schools.

The number of questions on the examination paper may vary somewhat from year to year.

Junior Certificate 2012 – Ordinary Level

Mathematics (Project Maths – Phase 2) – Paper 2

Sample Paper

Time: 2 hours