



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination 2014

Mathematics

(Project Maths – Phase 3)

Paper 1

Ordinary Level

Friday 6 June – Afternoon, 2:00 to 4:00

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			
7			
8			
9			
10		Total	

Grade

Instructions

There are 15 questions on this examination paper. Answer **all** questions.

Questions do not necessarily carry equal marks. To help you manage your time during this examination, a maximum time for each question is suggested. If you remain within these times you should have about 10 minutes left to review your work.

Question 15 carries a total of 50 marks.

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.

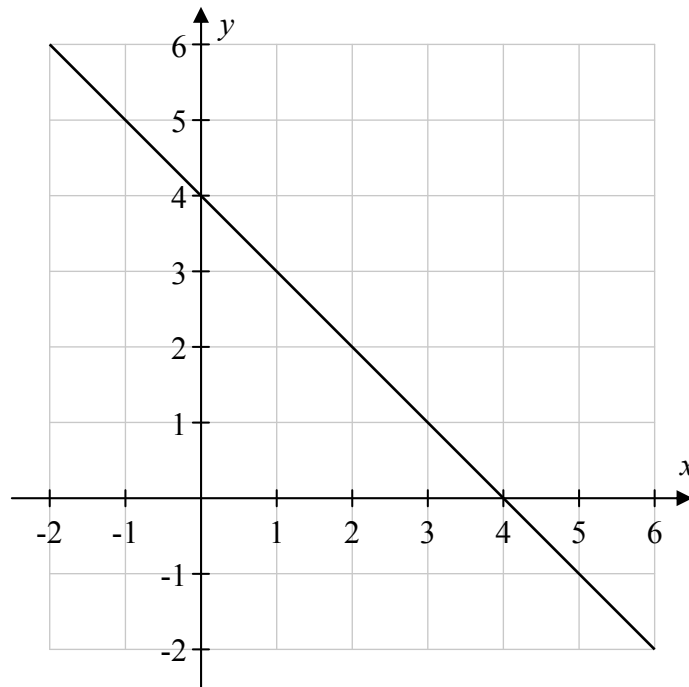
Answers should be given in simplest form, where relevant.

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

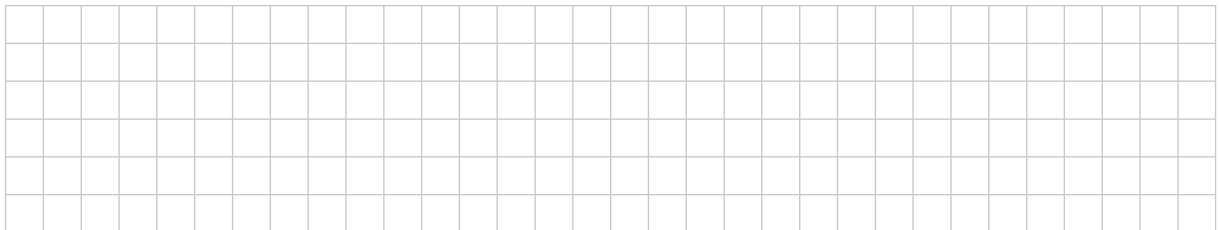
Question 14

(Suggested maximum time: 10 minutes)

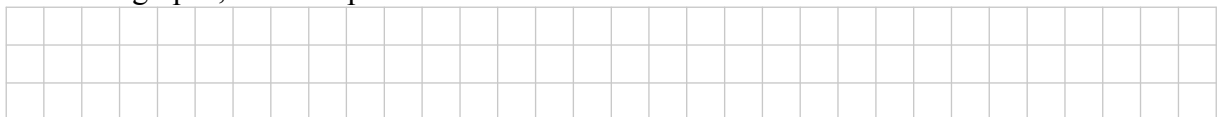
The graph of the line $y = -x + 4$ is shown below.



(i) Using the same axes and scales, draw the graph of the line $y = x + 2$.



(ii) From the graphs, state the point of intersection of the two lines.



(iii) Verify your answer to **(ii)** using algebra.

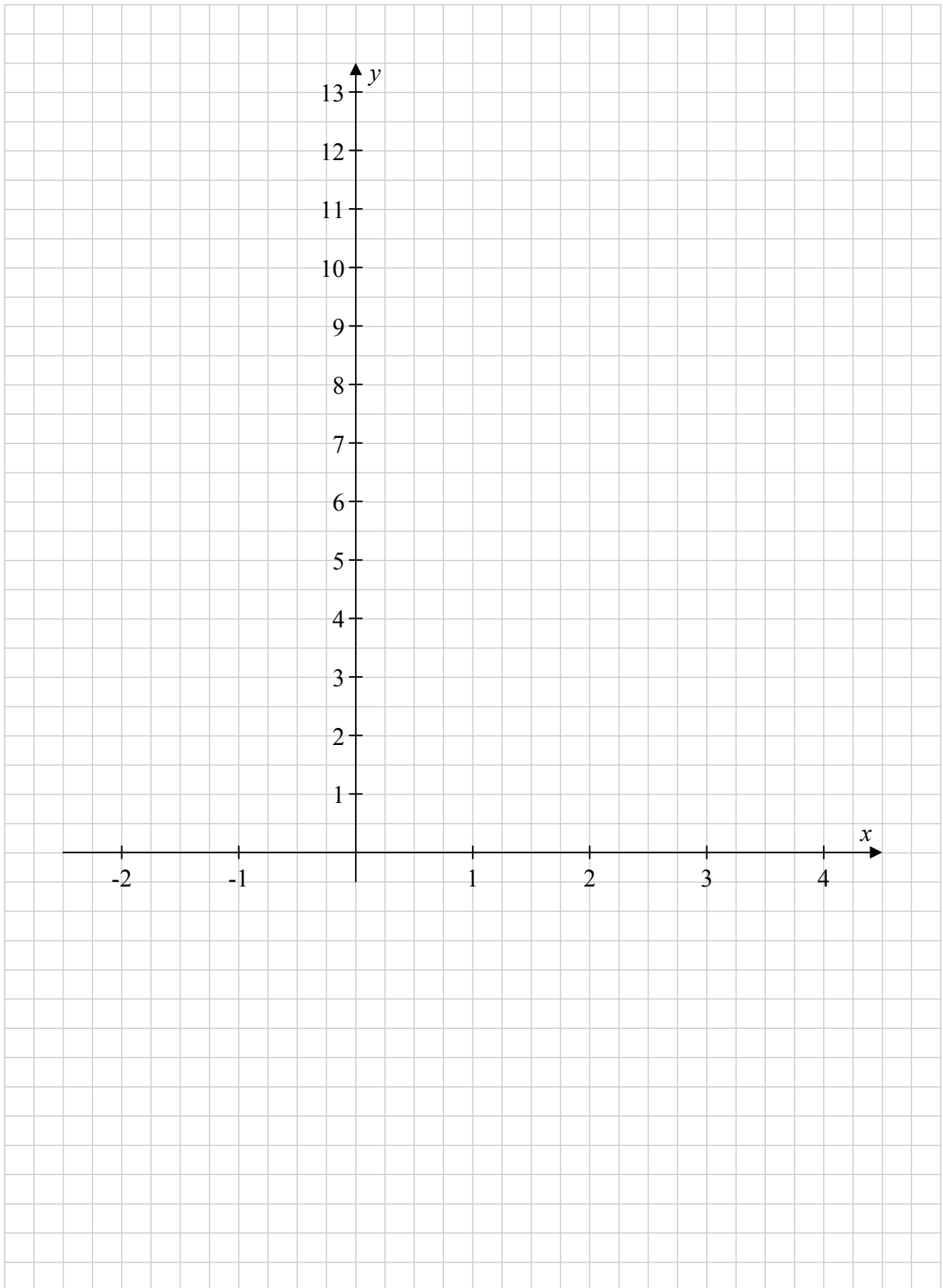


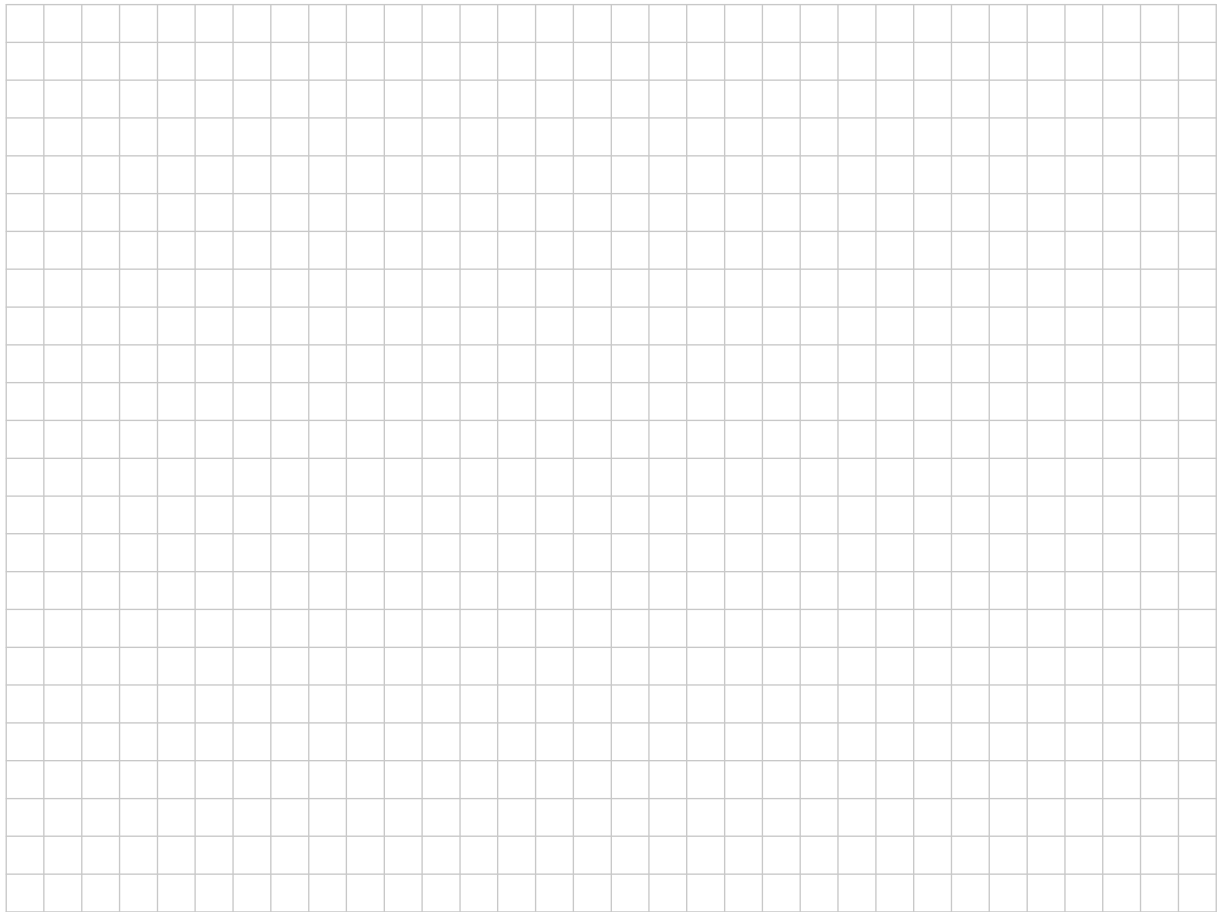
Question 15

(Suggested maximum time: 15 minutes)

- (i) Draw the graph of the function $f : x \mapsto x^2 - 2x + 4$ in the domain $-2 \leq x \leq 4$, where $x \in \mathbb{R}$.

There is more room for working out on the next page.



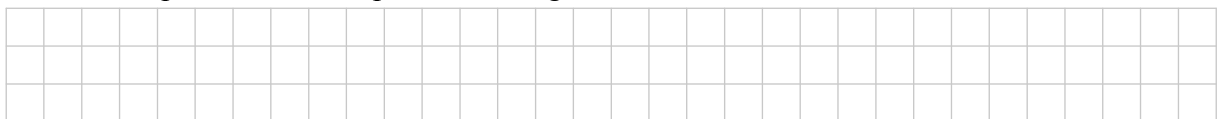


The function $f : x \mapsto x^2 - 2x + 4$ gives the predicted wind speed, in km per hour, over a 6-hour period of time.

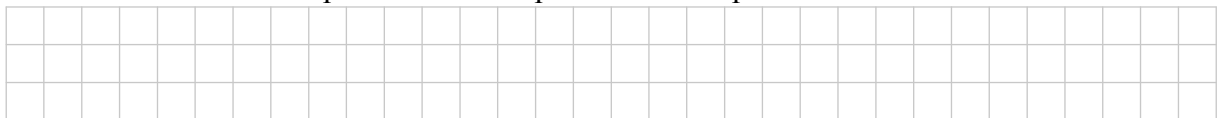
The x -axis represents the time from 10 p.m. ($x = -2$) to 4 a.m. ($x = 4$).

Use your graph from (i) to answer the following questions. Show your work on the graph.

(ii) What is the predicted wind speed at midnight?

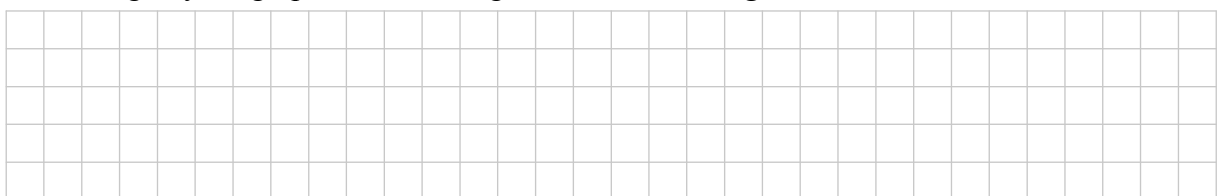


(iii) Find the times when the predicted wind speed is 5.5 km per hour.

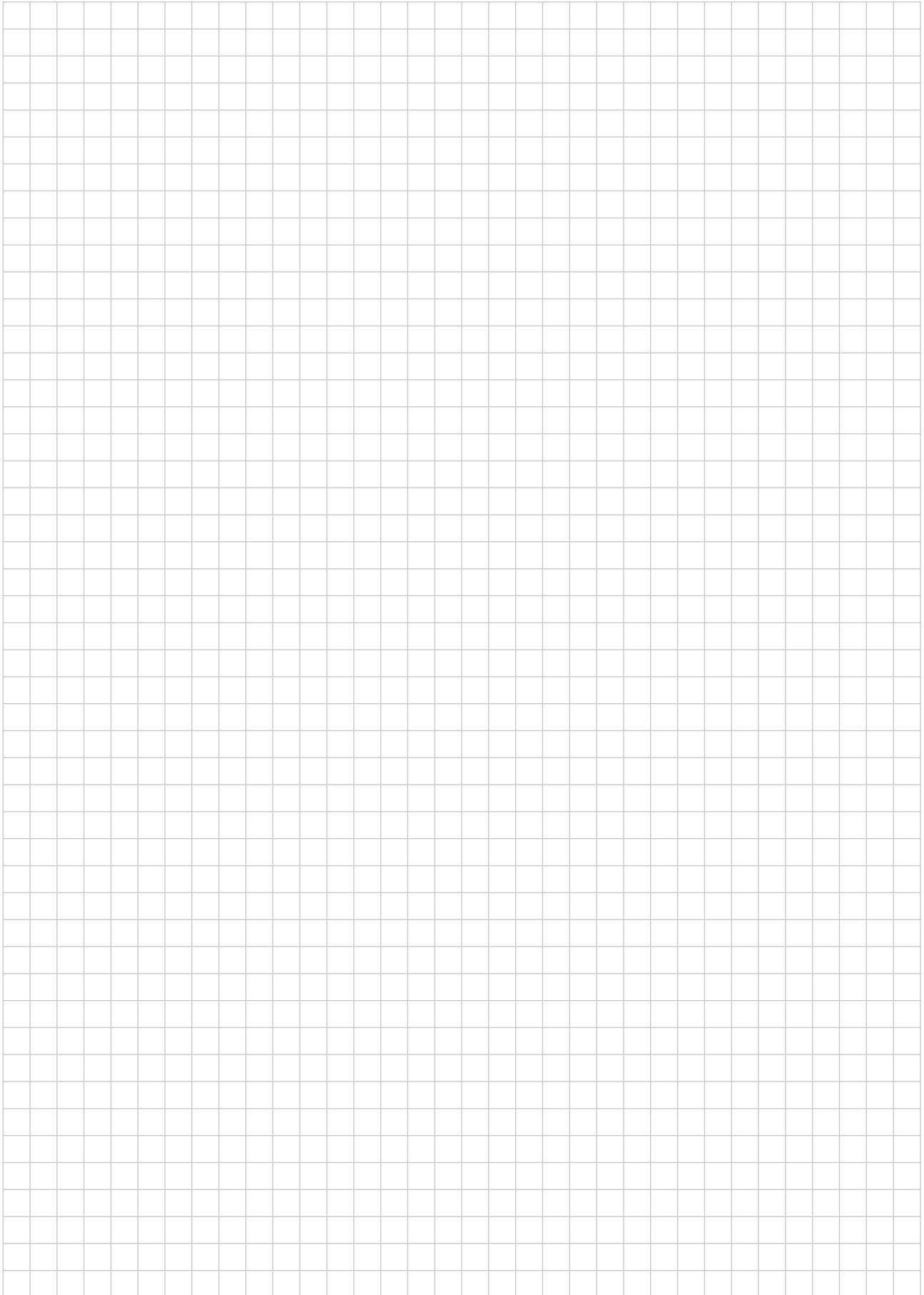


(iv) If the wind speed is between 1.1 km per hour and 5.5 km per hour, it is called *light air*.

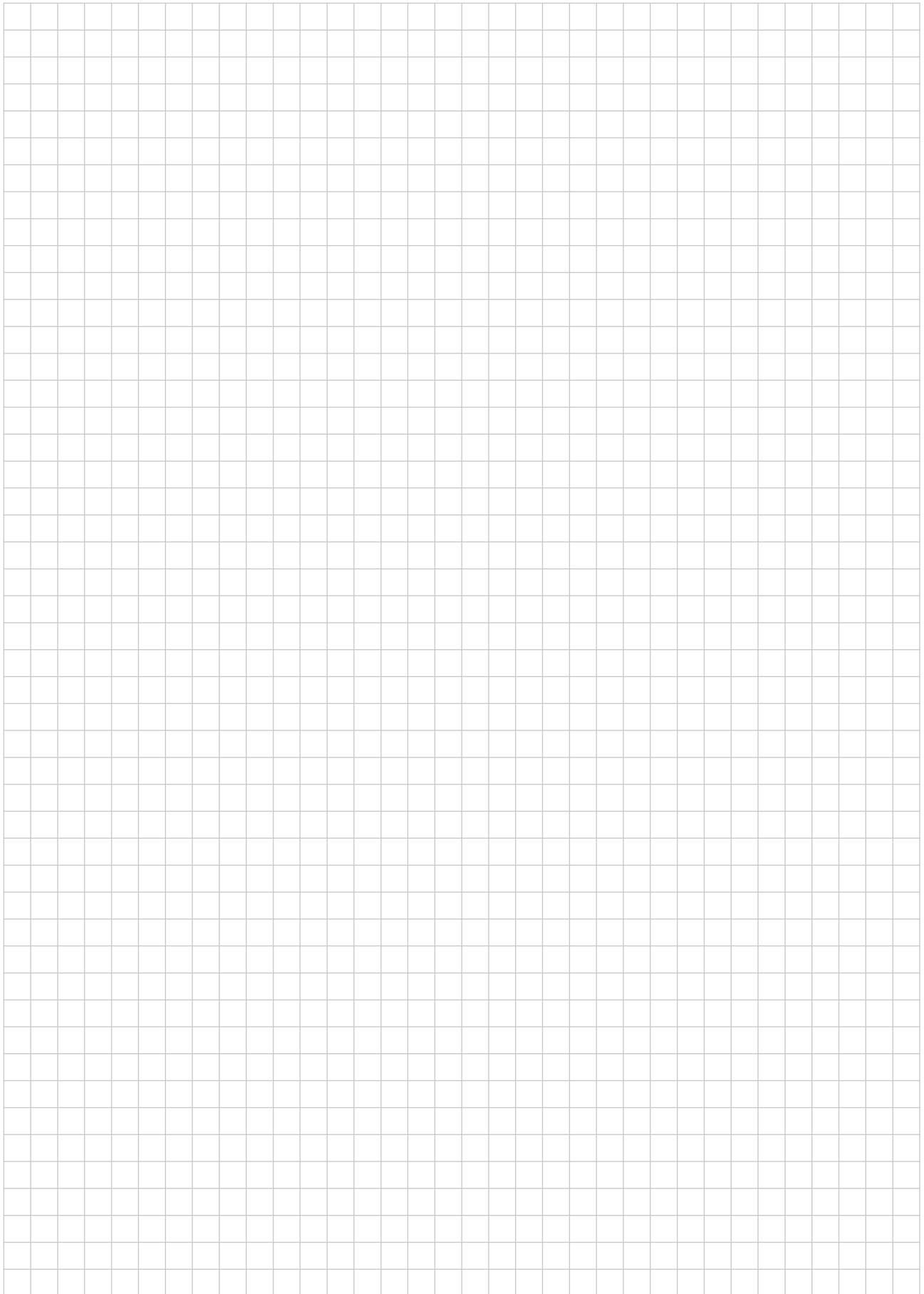
According to your graph, for how long will the wind be *light air*?



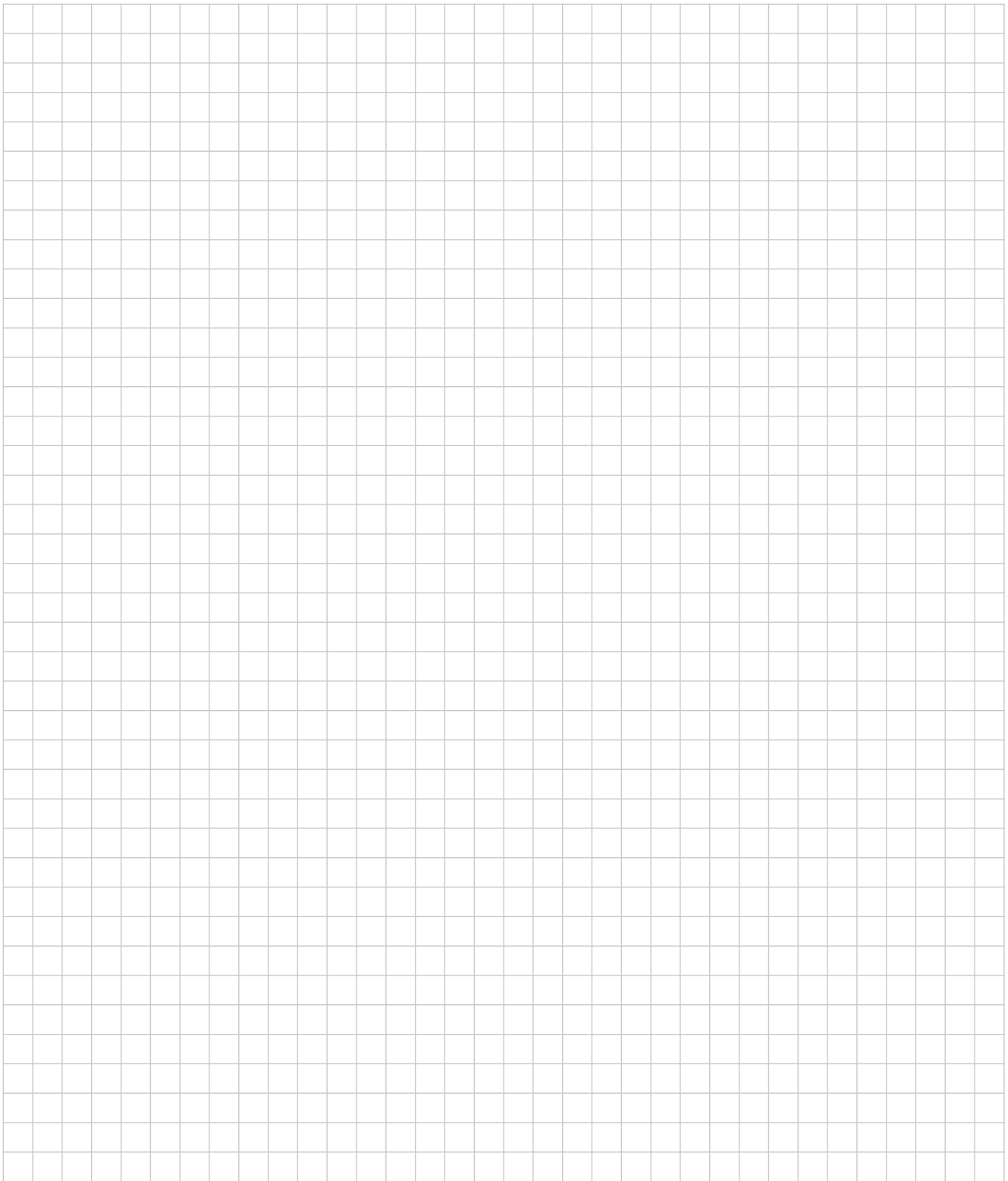
You may use this page for extra work.



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