



NAME 

SCHOOL 

TEACHER 

Pre-Leaving Certificate Examination, 2014

Mathematics (Project Maths – Phase 3)

Paper 2

Ordinary Level

Time: 2 hours, 30 minutes

300 marks

School 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, as follows:

In Section A, answer

Questions 1 to 5 and

either Question 6A **or** Question 6B.

In Section B, answer Questions 7, 8 and 9.

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.

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 2

(25 marks)

A recent campaign by Safefood Ireland reported that 4 out of 5 children and young people in Ireland today do not meet physical activity guidelines.

The students in a 2014 Leaving Certificate year decided to investigate how much sport or exercise students in their school participated in. In a survey, students were asked to indicate, to the nearest hour, how much time they spent doing sport or exercise during the previous week. Most students responded and a random sample of results was generated. These results are as follows:

3	3	6	10	3	3
4	5	3	4	5	5
3	3	5	6	3	8

(a) How might a random sample be generated?

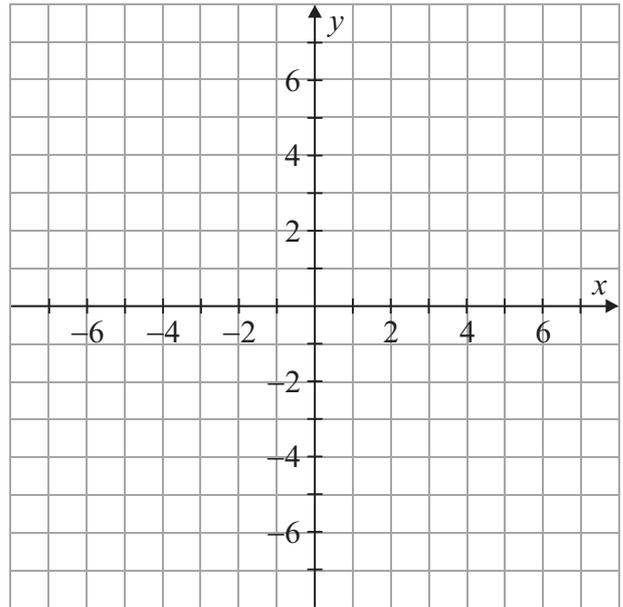
(b) Display the data using a suitable graphical representation.

Question 3

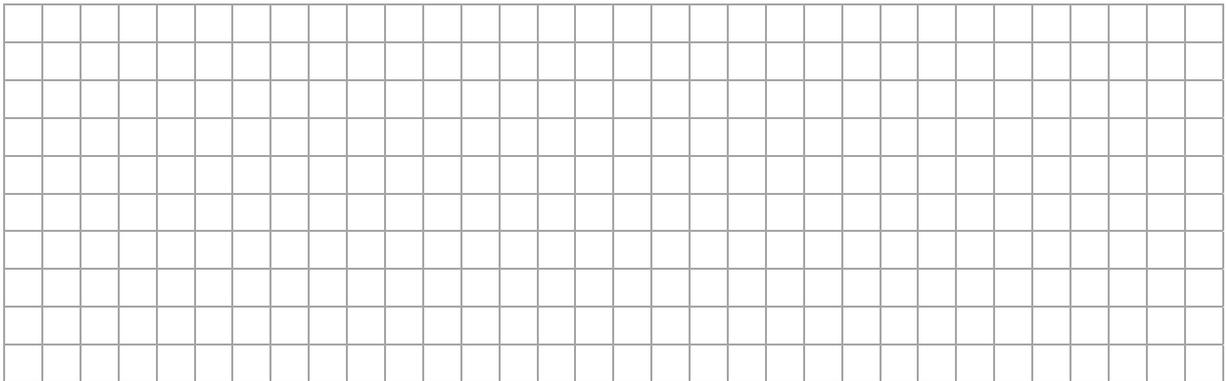
(25 marks)

The line l passes through the points $P(0, 6)$ and $Q(4, -2)$.
The line k is perpendicular to line l and passes through Q .

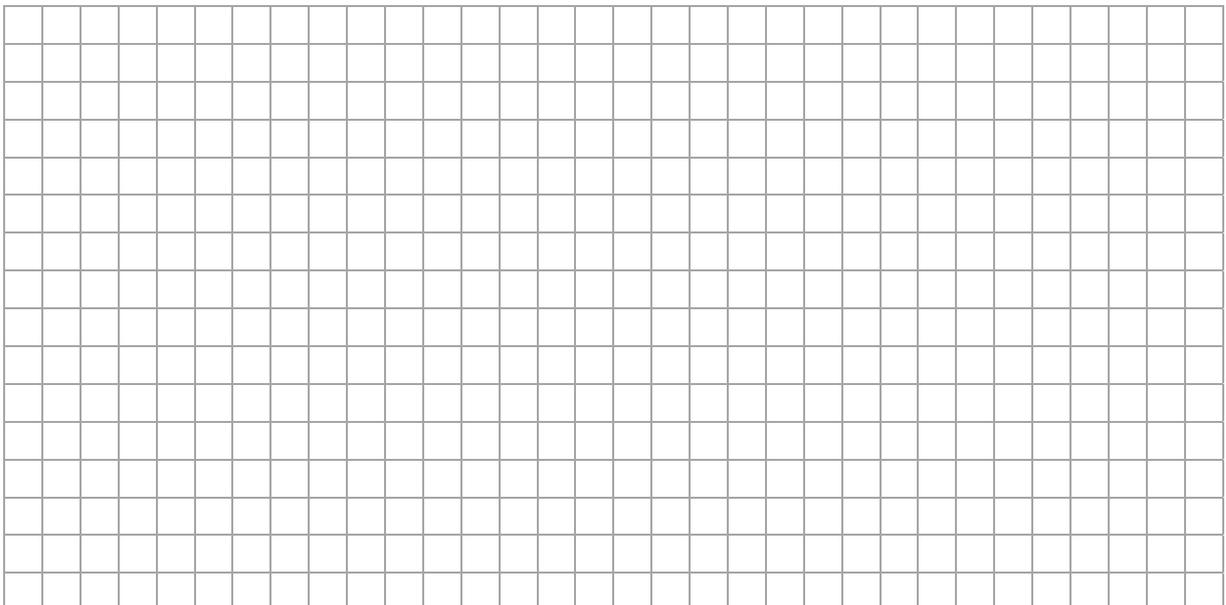
- (a) Plot P and Q on the co-ordinate diagram and show the line l .



- (b) Find the equation of the line l .



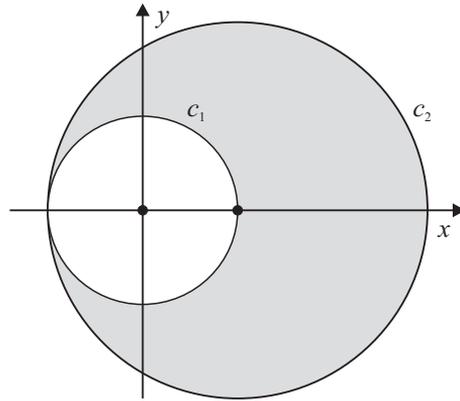
- (c) The line k cuts the y -axis at the point R .
Find the area of the triangle PQR .



Question 4

(25 marks)

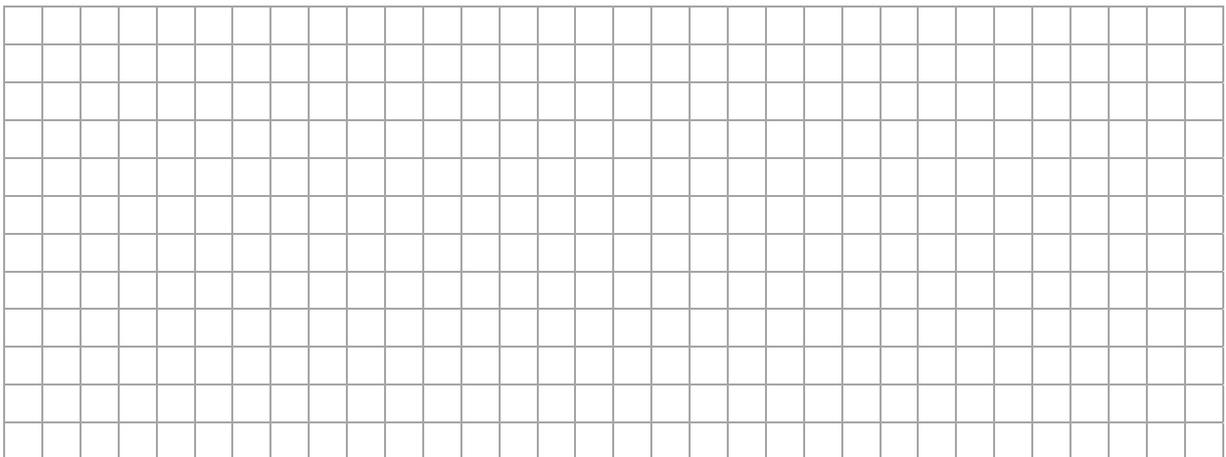
The diagram shows two circles c_1 and c_2 .



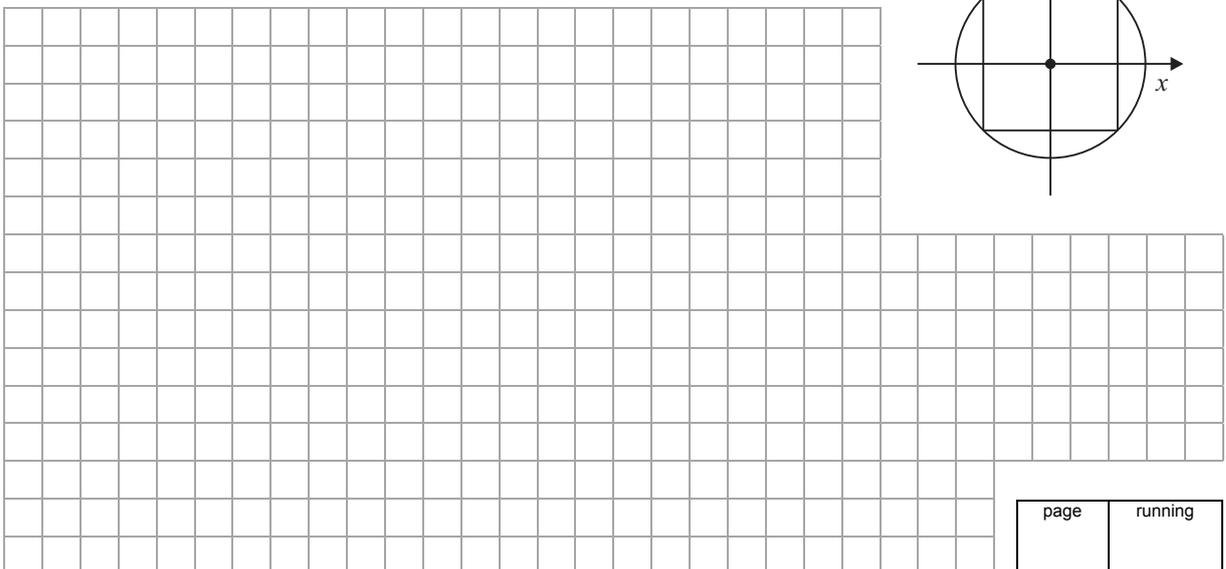
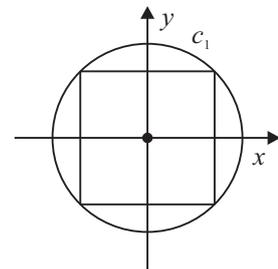
(a) Complete the following table:

Circle	Centre	Radius	Equation
c_1	$(0, 0)$	3	
c_2			

(b) Show, by calculation, that the point $(2, -3)$ lies within the shaded region in the diagram above.

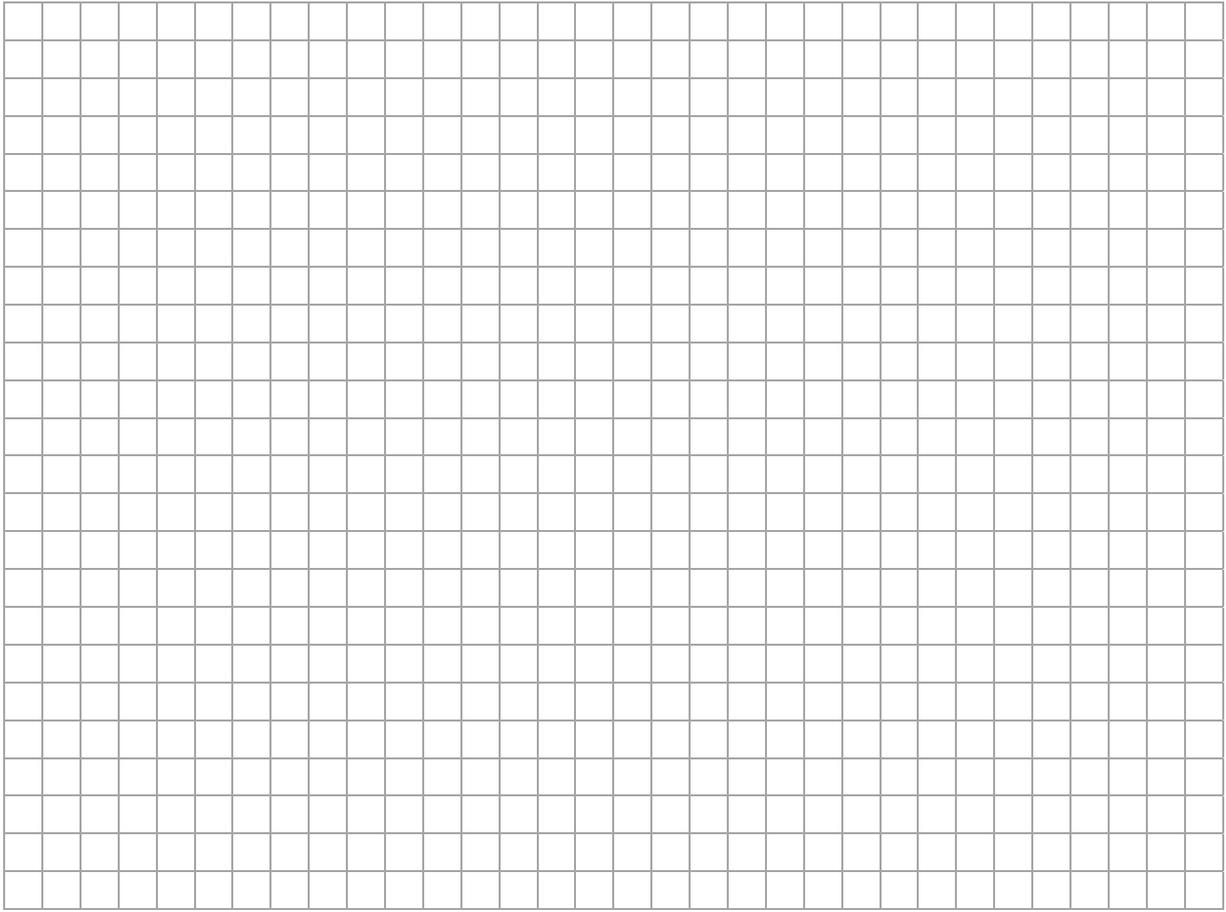


(c) The vertices of a square touch circle c_1 , as shown. Find the area of the square.



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- (c) The triangle $A'B'C'$ is the image of triangle ABC under the enlargement with centre A and scale factor 2.5 . Find the area of triangle $A'B'C'$, correct to one decimal place.



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Question 6

(25 marks)

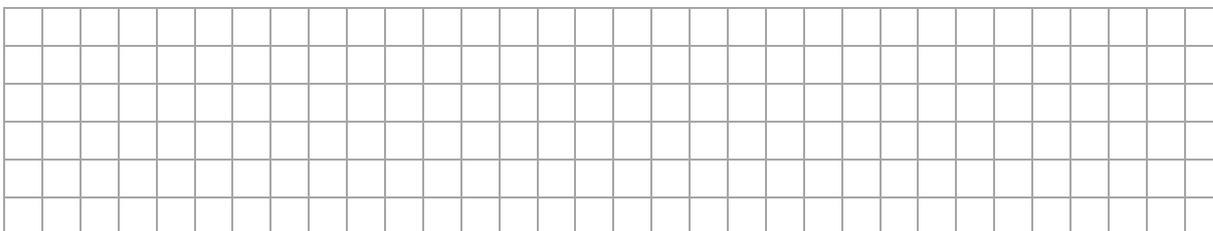
Answer **either** 6A **or** 6B.

Question 6A

- (a) Given the point A below, construct, without using a protractor or setsquare, an angle of 60° at A . Hence, construct the triangle ABC such that $|AB| = 13$ cm, $|AC| = 6$ cm and $|\angle CAB| = 60^\circ$. Show all construction lines clearly.



- (b) (i) Explain what is meant by the *incircle* of a triangle.



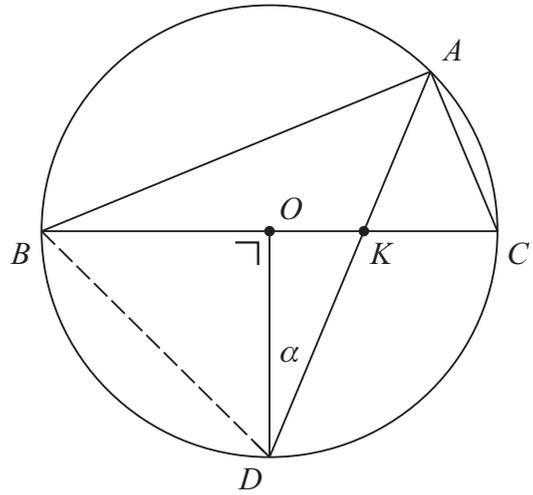
- (ii) On the diagram above, construct the incentre and incircle of triangle ABC , using a compass and straight edge only. Show all construction lines clearly.

OR

Question 6B

BC is the diameter of a circle, centre O .

$|AB| = |AD|$ and $|\angle BOD| = 90^\circ$.



Let $|\angle ODK| = \alpha$.

Prove that the triangle AKC is isosceles.

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Question 9

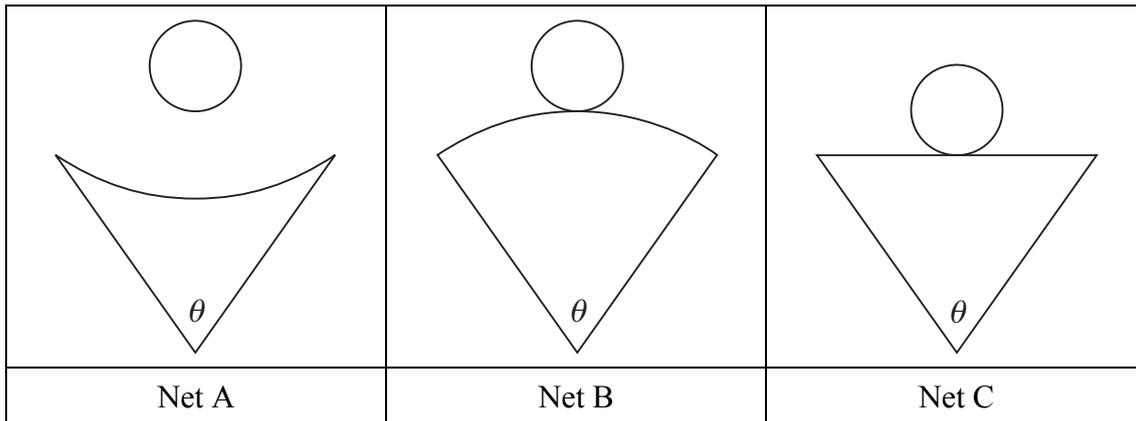
(35 marks)

A ‘cornetto’ ice-cream cone is a branded frozen dessert product created and manufactured in the shape of an inverted right cone. It was first produced in Naples, Italy in 1959 but it is now sold widely throughout the world.



A researcher is investigating the packaging requirements for different size cornetto ice-cream cones.

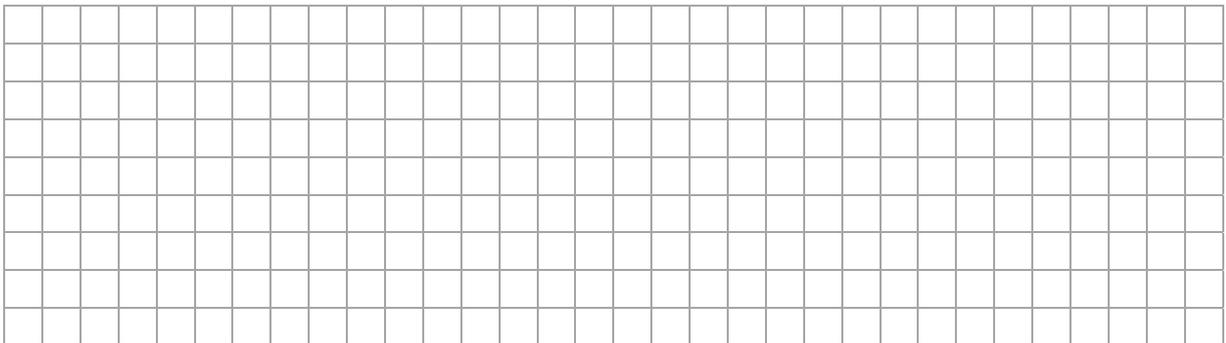
- (a) A standard size cornetto ice-cream cone has a slant height of 16 cm and a diameter of 6 cm. The diagram below shows three possible nets for the wrapper of the ice-cream cone.



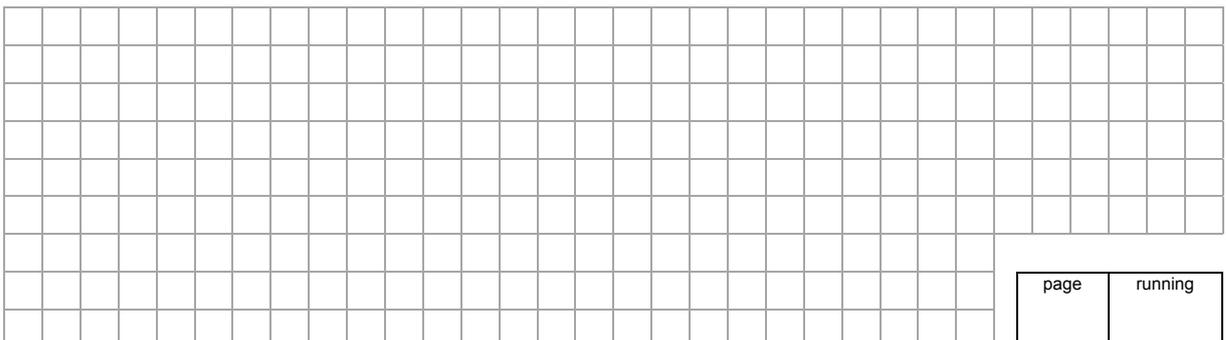
- (i) Which of the above shows the correct net for the wrapper?

Answer: _____

- (ii) Assuming there is no overlap on the wrapper, calculate the area of the paper required for the wrapper, correct to the nearest cm^2 .



- (iii) Calculate the value of θ , the angle at the base of the net, as shown in the diagram above. Give your answer correct to the nearest degree.



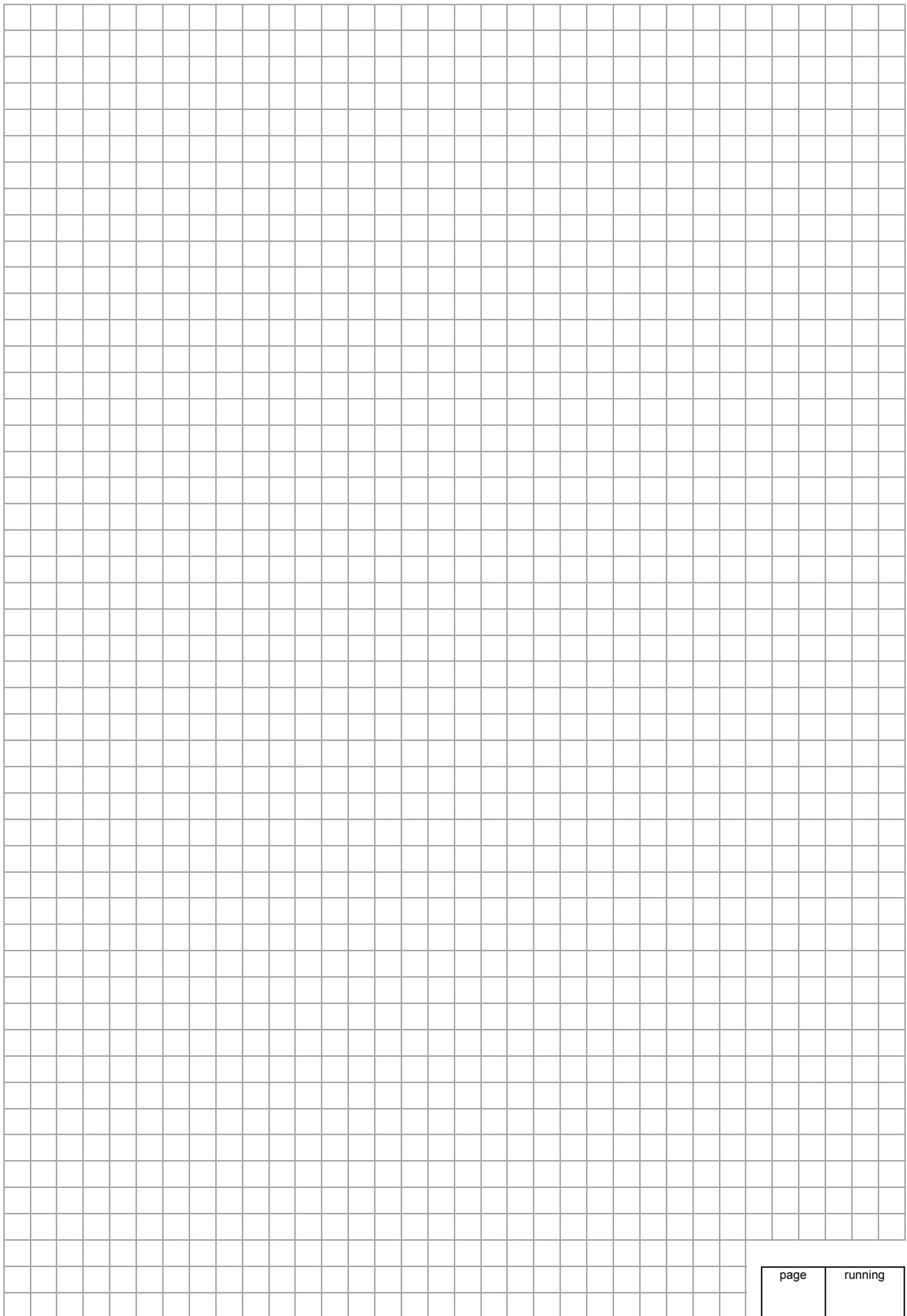
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- (b) The manufacturer wants to investigate the idea of producing a ‘super-size’ ice-cream cone. It is proposed that the standard size ice-cream cone would be enlarged by a scale factor of 1.5.
- (i) Find the slant height and diameter of the super-size ice-cream cone and hence, calculate the area of the paper required for the wrapper, correct to the nearest cm^2 , assuming there is no overlap on the wrapper.

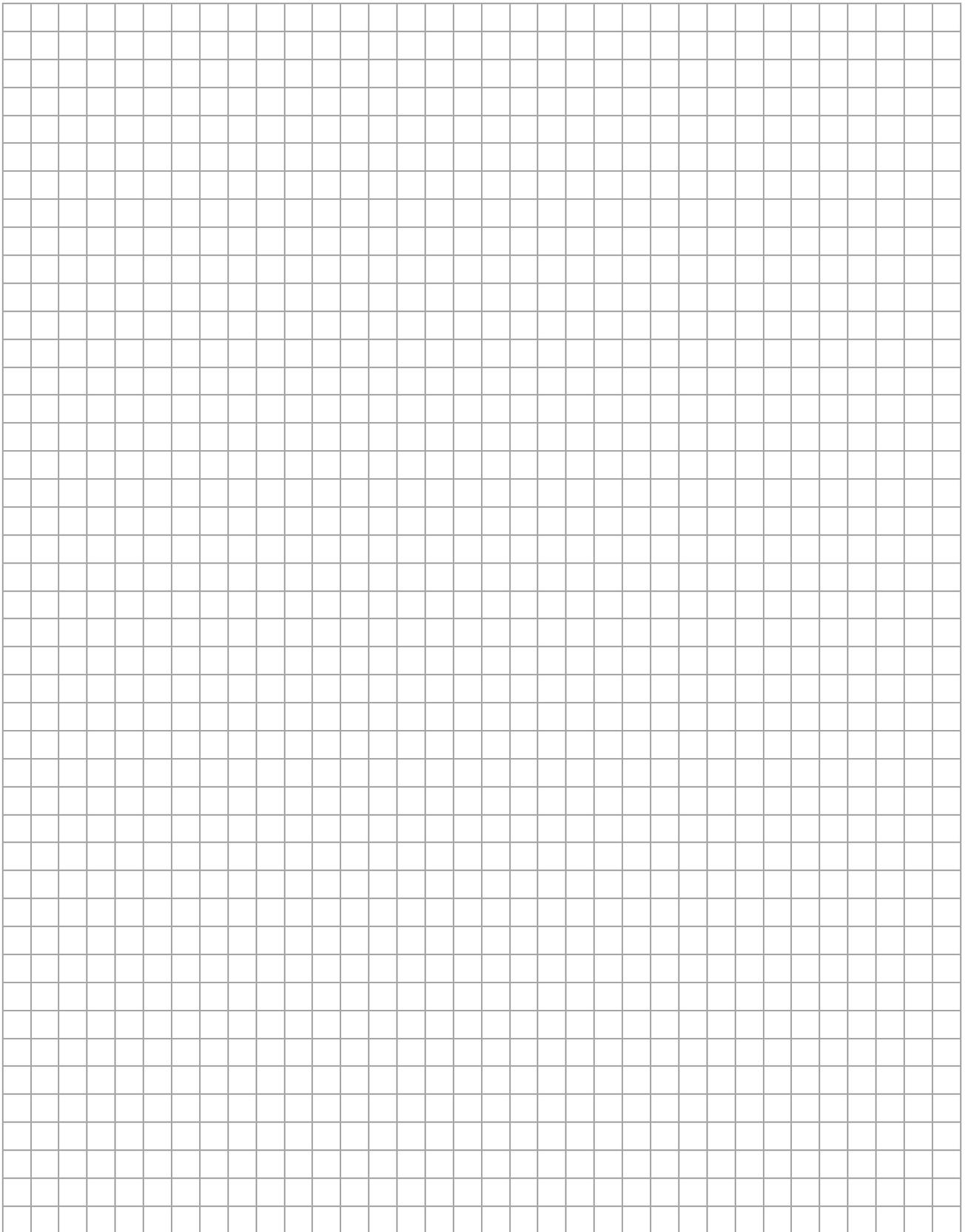
- (ii) Find the ratio of the area of the wrapper for the super-size cone to the area of the wrapper for the standard cone. What can you conclude in relation to the ratio from your answer?

- (iii) Investigate the ratio of the volumes of ice-cream required to fill the two ice-cream cones (assuming that the cone wafer has a negligible thickness). Can you conclude that the ratio of the volumes is equal to the cube of the scale factor?

You may use this page for extra work.



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