Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination 2014
Sample Paper

Mathematics
(Project Maths – Phase 2)

Foundation Level

Time: 2 hours

300 marks

Examination number

Centre stamp

Running total	

For examiner			
Question	Mark	Question	Mark
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		Total	

Grade

Instructions

There are 19 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.

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 1 **(Suggested maximum time: 5 minutes)**

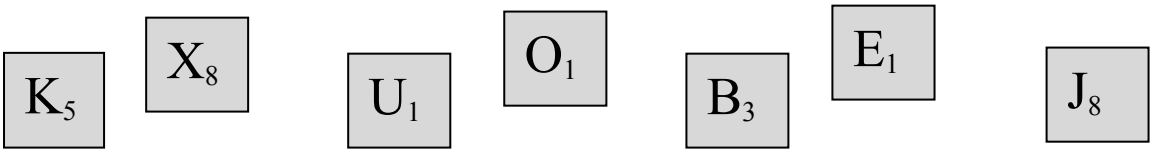
Find the value of:

(a) **(i)** $293 + 78 =$ _____

(ii) $38 \times 7 =$ _____

(b) In the game of *Scrabble*, players score points by forming words from individual lettered tiles and placing them on a board. The points for each letter are written on the tile. To find the total score for a word, a player adds together the points for each tile used.

In a game, Maura selects these seven tiles.



She then arranges them to form the word below.

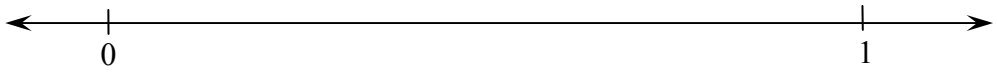
J_8	U_1	K_5	E_1	B_3	O_1	X_8

(i) Find the total number of points that Maura would score for the above word.

(ii) Liam looks at the same letters but can only form a three-letter word worth 12 points. Write down a three-letter word that Liam might have chosen.

Question 2 **(Suggested maximum time: 2 minutes)**

(a) **(i)** Represent the numbers 0·6 and 0·4 on the number line below.



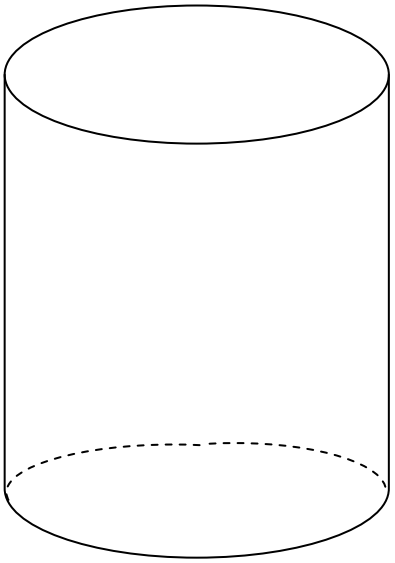
(ii) Which is the bigger of the two numbers? _____

(b) Estimate what fraction of the strip below is shaded.

Answer: $\frac{\quad}{\quad}$

(c) Shade in $\frac{3}{4}$ of the strip below.

(d) Show the approximate height of water in the cylinder if the cylinder is $\frac{4}{5}$ full.



Question 3 **(Suggested maximum time: 10 minutes)**

Mary is planning to fly to London. The table shows the flights leaving Dublin Airport (DUB) and arriving in London Heathrow Airport (LHR) on a particular day.

Departing			Arriving	
DUB	06:40		LHR	08:05
DUB	07:30		LHR	09:05
DUB	08:50		LHR	10:15
DUB	09:50		LHR	11:10
DUB	12:10		LHR	13:25
DUB	13:40		LHR	14:55
DUB	14:40		LHR	15:55
DUB	15:50		LHR	17:10

(a) **(i)** Mary needs to arrive in Heathrow by 11:30 a.m. What is the departure time of the latest flight that she can take from Dublin Airport? _____

(ii) Find the time of her flight in hours and minutes.

(iii) Mary would like to arrive in Dublin Airport an hour and a half before her flight leaves. At what time should she arrive at the airport?

(b) Mary checks in one bag. The fare summary for her journey is given in the table below. Find how much the taxes and charges amount to.

Fare Summary (€)	
From Dublin to London Heathrow	
Fare	74·99
Taxes and Charges	
Baggage	25·00
Total	**133·88**

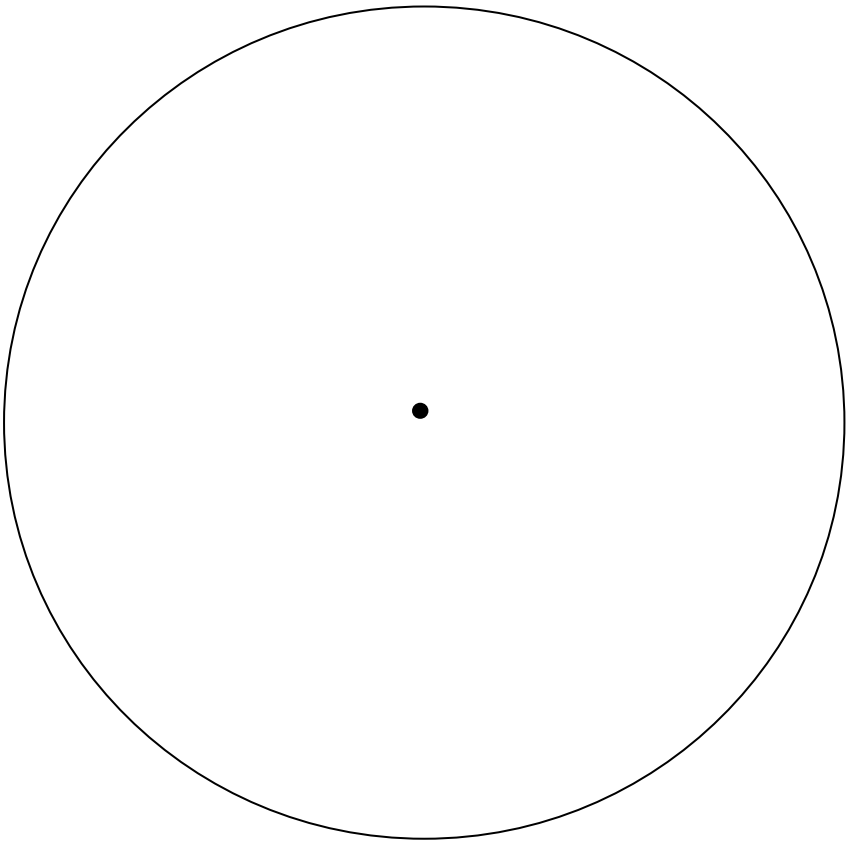
page	running

(c) Mary travels to the airport on a motorway at a steady speed of 100 km/h. How long does it take her to travel 25 km at this speed?

Time = $\frac{\square}{\square}$ =

Question 4 **(Suggested maximum time: 5 minutes)**

(i) Measure and write down the diameter of the circle below. Give your answer correct to the nearest cm.



Diameter = _____cm

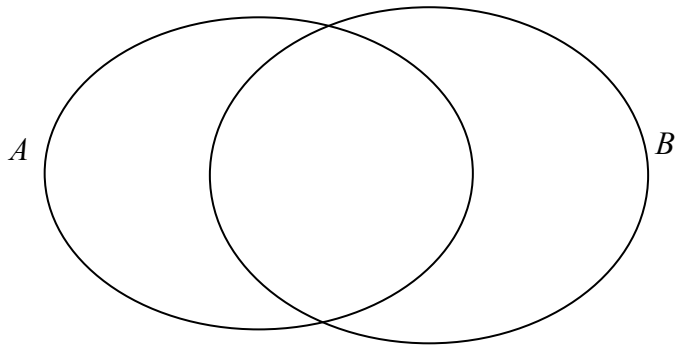
(ii) Find the radius of the circle. Radius = _____cm

(iii) Find the area of the circle.

Question 5 **(Suggested maximum time: 2 minutes)**

$A = \{c, e, l, w\}$ and $B = \{m, e\}$.

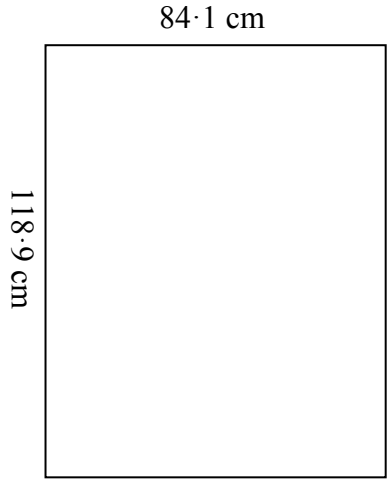
(i) Show the elements of the sets A and B on the Venn diagram below.



(ii) List the elements of $A \cup B$. $A \cup B = \{ \quad , \quad , \quad , \quad , \quad \}$

Question 6 **(Suggested maximum time: 5 minutes)**

(i) The diagram shows an A0-sized sheet of paper which measures 84·1 cm by 118·9 cm. In order to estimate the area of an A0 sheet:



Write down the nearest whole number to 84·1: _____

Write down the nearest whole number to 118·9: _____

Multiply your two answers to estimate the area.

_____ × _____ = _____

(ii) Find the exact area of the sheet using the original measurements.

84·1 cm × 118·9 cm = _____

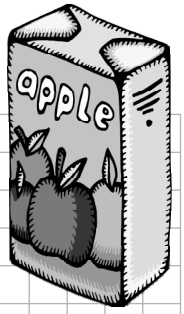
(iii) Find the difference between the exact area from **(ii)** and your estimate of the area from **(i)**.

Exact area	–	Estimated Area	=	Difference

page	running

Question 7 **(Suggested maximum time: 5 minutes)**

(i) A juice carton is 5 cm wide, 10 cm long, and 20 cm high. Calculate the volume of the carton.



(ii) The carton is full of juice. How many glasses can be filled from the carton, if each glass can hold 200 ml?

Question 8 **(Suggested maximum time: 5 minutes)**

Sinéad has €12 in an account. She decides to put €4 into the account each week for the following 10 weeks.

(i) Complete the table to show how much she will have saved at the end of each week.

Week No.	Amount Saved (€)
0	12
1	16
2	
3	
4	
5	
6	
7	
8	
9	
10	

(ii) How much will Sinéad have in the account at the end of 10 weeks? _____

(iii) She would like to buy a cordless drill costing €39. How many weeks will she have to wait, from the time she starts, until she can afford to buy the drill?

_____

(iv) How much money will she have saved in 20 weeks?

(v) Write down in words how you would find the amount in the account for any given week.

page	running

Question 9 **(Suggested maximum time: 5 minutes)**

For each of the events **A**, **B**, **C**, **D**, and **E** below, estimate its probability and place the letter in the most appropriate position on the probability scale below.

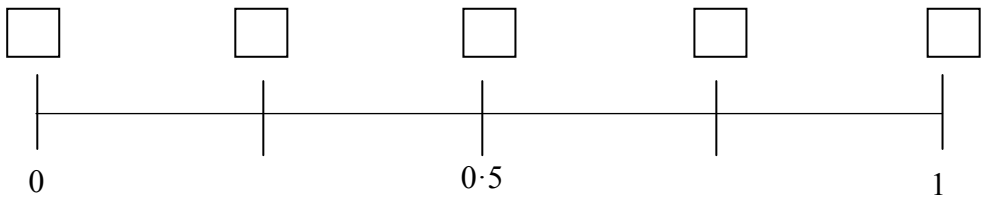
A name is picked at random from a list of 50 girls and 50 boys.
A = A girl's name is picked.

One card is drawn at random from a pack of playing cards.
B = The card is a diamond.

A day is chosen at random from a list of the days of the week.
C = The name of the day contains the letter **a**.

One number is picked at random from the set {1, 2, 3, 4, 5, 7, 11, 13}.
D = The number chosen is a prime number.

The three angles of a particular triangle are measured and added together.
E = The answer is $100°$.



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

Sophie has a box of buttons.

Contents
3 yellow buttons
5 green buttons
7 red buttons
4 purple buttons
1 black button

(i) How many buttons are in the box? _____

She takes a button from the box at random.

(ii) What is the probability that Sophie will get a black button? $\frac{\quad}{\quad}$

(iii) Write the missing colour in the sentence below.

The probability that Sophie will get a _____ button is $\frac{1}{4}$.

Question 11 **(Suggested maximum time: 5 minutes)**

The number of children born in the Irish Republic each year from 1999 to 2009 is given in the table below.

Year	*Number Of Births*
1999	53 924
2000	54 789
2001	57 854
2002	60 503
2003	61 529
2004	61 972
2005	61 372
2006	65 425
2007	71 389
2008	75 056
2009	74 728

(i) How many children were born in 2005? _____

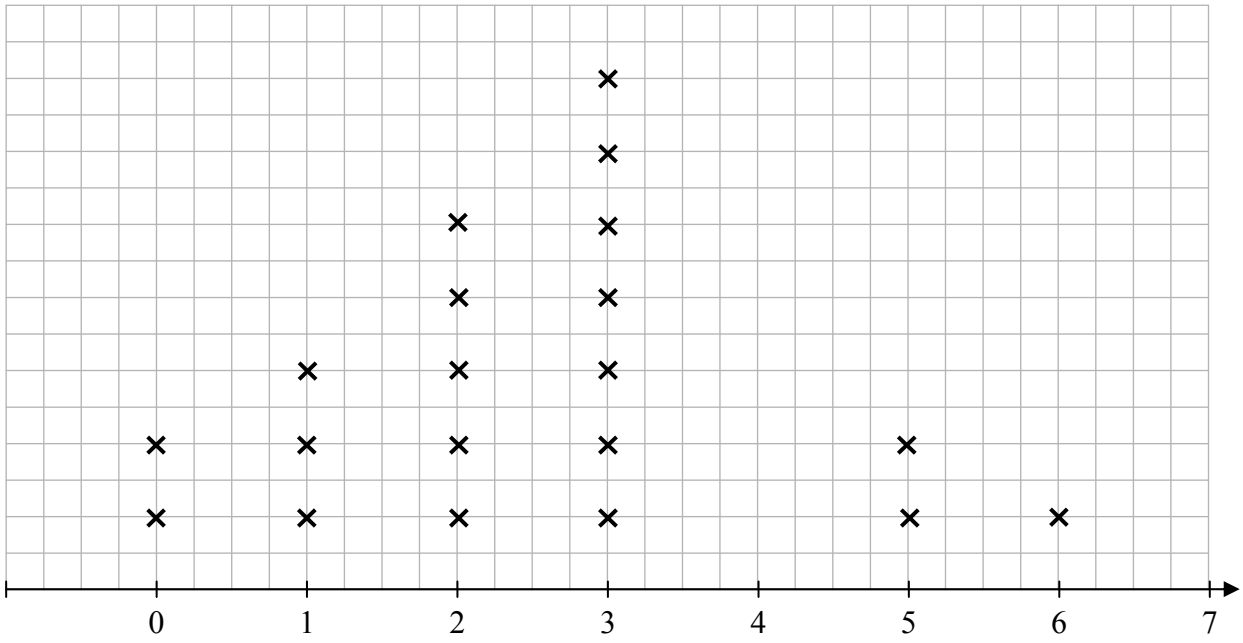
(ii) In which years did the birth rate decrease? _____ and _____

(iii) In which year did the largest increase take place?

(iv) Comment on the trend in birth rate in Ireland from 1999 to 2009.

Question 12 **(Suggested maximum time: 5 minutes)**

Students in a class were asked how many books they had read in the previous month. The results are shown in the line plot below.



(i) What is the mode of the data? _____

(ii) How many students read more than two books during the month? _____

(iii) How many students were in the class?

Question 13 **(Suggested maximum time: 5 minutes)**

These are the names of fifteen people on a youth club basketball squad.

Alex	Claire	Kevin	Yetunde	Brian
Claire	Lucy	Tom	Claire	James
Seya	Ryan	Jodi	Liam	Tom

(i) What name is the **mode**? _____

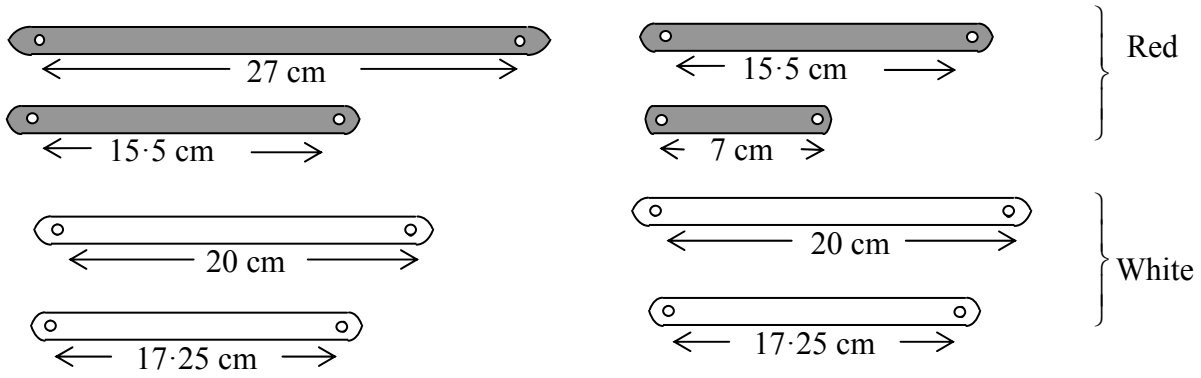
(ii) One person leaves the squad. A different person joins the squad.
Now the **mode** is **Tom**.
Write the missing names in the sentences below.

The name of the person who **leaves** is _____.

The name of the person who **joins** is _____.

Question 14 **(Suggested maximum time: 5 minutes)**

Mary has a set of coloured plastic strips (long red, middle red, short red, etc.). These strips can be joined together with pins through small holes at their ends.

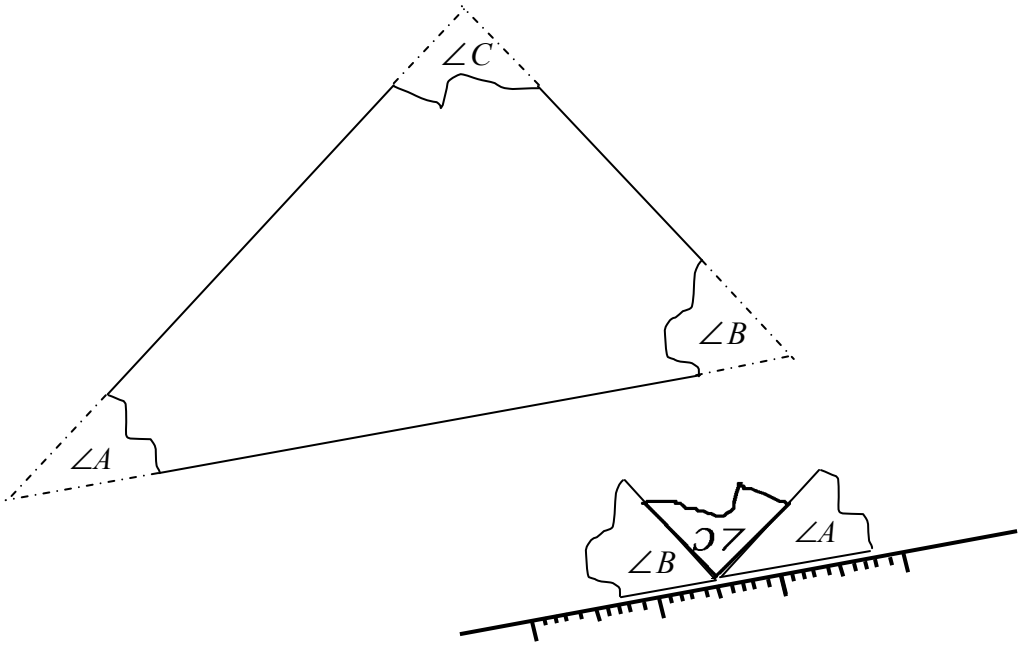


(i) John wants to make an isosceles triangle using three of the four red strips. Can he do this? Give a reason for your answer.

(ii) Mary thinks that she can form a parallelogram by using the four white strips. Can she do this? Give a reason for your answer.

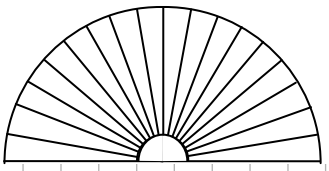
Question 15 **(Suggested maximum time: 5 minutes)**

In a classroom exercise, students cut out a triangle. They then tore off the corners and arranged them on a ruler as shown below.



(i) What do you think the students were trying to show?

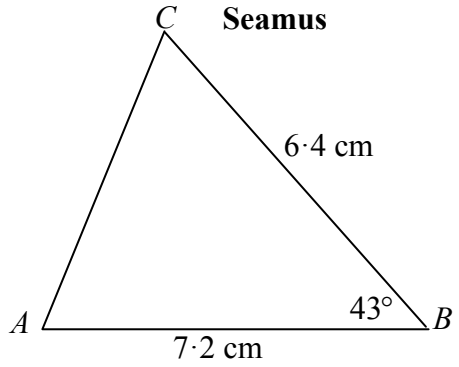
(ii) Describe another method to show the same result using a protractor.

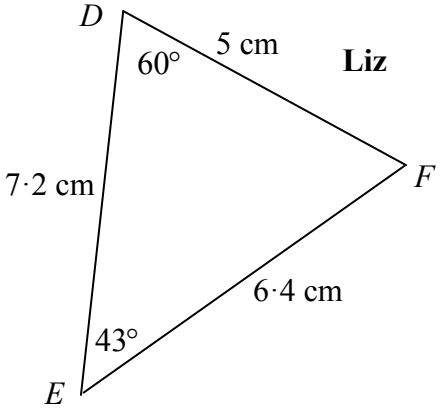


(iii) Do the methods above prove that this result is true for all triangles? Give a reason for your answer.

Question 16 **(Suggested maximum time: 10 minutes)**

Seamus and Liz mark the positions of three particular towns from a map onto tracing paper. Seamus labels the towns *A*, *B*, and *C*. Liz labels them *D*, *E*, and *F*. They then measure some distances and angles on their diagrams, as shown. Seamus says that the diagrams look different and that one of them must be incorrect. Liz says that that does not matter because their triangles are congruent.





(i) Explain what it means to say that two triangles are *congruent.*

(ii) Do you agree with Liz that the two triangles are congruent? Give reasons for your answer.

(iii) Calculate the third angle in Liz's triangle and write it in on her diagram.

(iv) Write the remaining angles and side into Seamus's diagram.

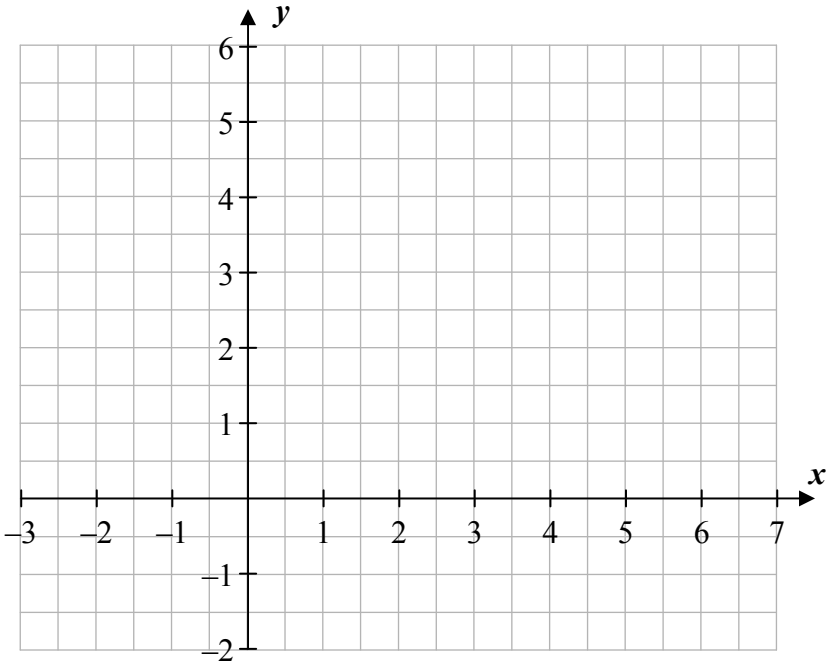
(v) The scale below was written at the bottom of the map. Use this scale to calculate the actual distance, in kilometres, between town *A* and town *B* on the first diagram.

1 : 200 000

page	running

Question 17 **(Suggested maximum time: 10 minutes)**

(i) Plot the points $A(5, 1)$, $B(5, 3)$, $C(-1, 3)$, and $D(-1, 1)$ on the co-ordinate plane below.



(ii) Join A to B, B to C, C to D, and D to A to form a shape.

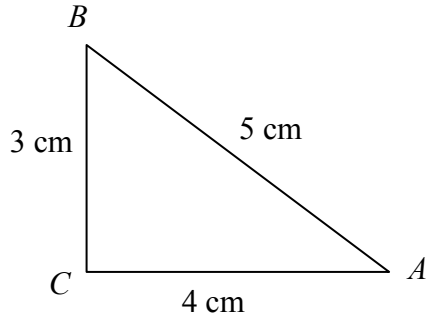
(iii) Name the shape. _____

(iv) Write down two properties of that shape.

(v) On your diagram above, draw two axes of symmetry of the shape.

Question 18 **(Suggested maximum time: 5 minutes)**

Jamie constructs the triangle ABC shown in the diagram:



(i) Use the Theorem of Pythagoras to verify that ΔABC is a right-angled triangle.

X is one of the angles in ΔABC, and $\sin X = \frac{4}{5}$.

(ii) What is the length of the side opposite the angle X? Answer: _____

Hint: $\sin X = \frac{\text{opposite}}{\text{hypotenuse}}$.

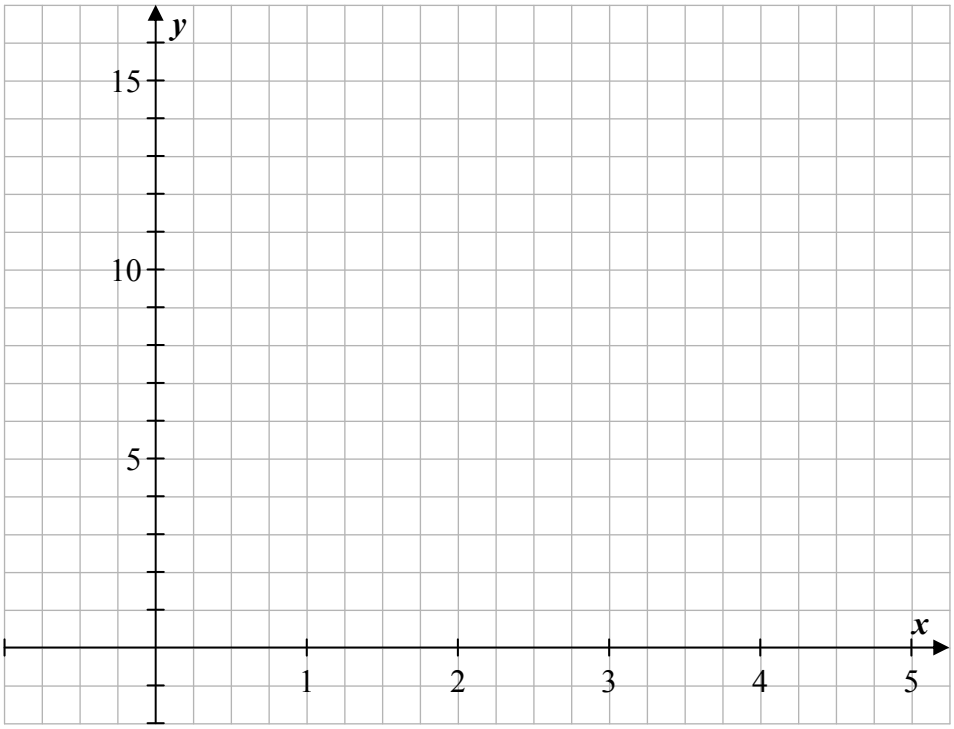
(iii) Mark in the angle X on the diagram above.

Question 19 **(Suggested maximum time: 10 minutes)**

(i) Given that $y = 3x + 1$, complete the table below. Show all your work.

x	1	2	3	4
y			10	

(ii) Using your answers from **(i)**, draw the graph of $y = 3x + 1$ from $x = 1$ to $x = 4$.



(iii) Use your graph to find the value of y when $x = 3{\cdot}5$. Show your work on the graph.

$y =$

You may use this page for extra work

page	running

Note to readers of this document:

This sample paper is intended to help teachers and candidates prepare for the June 2014 examination in *Mathematics* under Phase 2 of *Project Maths*. The content and structure do not necessarily reflect the 2015 or subsequent examinations.

In the 2014 examination, the material in one question will be based on content from the previous syllabus. This will be similar in style and content to previous such questions. On this sample paper, Question 14 from the 2013 examination has been inserted, as Question 19, to illustrate.

Junior Certificate 2014 – Foundation Level

Mathematics (Project Maths – Phase 2)

Sample Paper
Time: 2 hours