Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination 2011
Sample Paper

Mathematics
(Project Maths – Phase 1)

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			
10		Total	

Grade

Instructions

There are eighteen 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 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.

Question 1 **(suggested maximum time: 2 minutes)**

(a) Find the value of $35 - 7$.

Answer: _____

(b) Find the value of $35 \div 7$.

Answer: _____

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

(a) List all the factors of 8.

(b) List all the factors of 12.

(c) List all the factors that are common to both 8 and 12.

(d) Write down the Highest Common Factor (HCF) of 8 and 12. _____

Question 3 **(suggested maximum time: 5 minutes)**

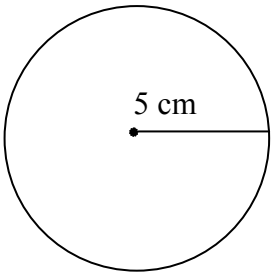
You buy a number of items in a shop. They are listed below.
Find the total cost of these items.

3 apples	@	€0·35 each.
2 fruit drinks	@	€1·29 each.
4 packets of crisps	@	€0·45 each.
3 bread rolls	@	€0·55 each.

3 Apples @ €0·35 each	= €
2 Fruit Drinks @ €1·29 each	= €
4 Packets of Crisps @ €0·45 each	= €
3 Bread Rolls @ €0·55 each	= €
Total	= €

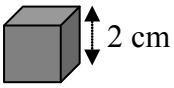
Question 4 **(suggested maximum time: 10 minutes)**

(a) The radius of a circle is 5 cm.
Calculate the perimeter of the circle. Use $\pi = 3{\cdot}142$.



(b) A rectangular block of wood is 10 cm long, 4 cm wide and 4 cm high.
Find the volume of the block in cm^3.

(c) The length of a side of a solid wooden cube is 2 cm.
Find the volume of the cube in cm^3.

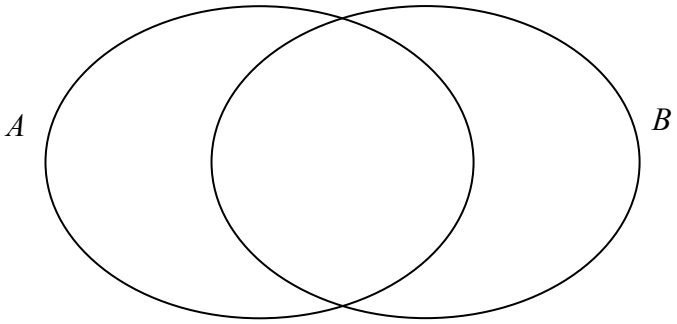


(d) How many of these wooden cubes can be made from the block of wood in part **(b)**?

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

$A = \{1, 5, 7, 9\}$ and $B = \{7, 9, 11\}$

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



(b) List the elements of $A \cap B$. Answer: $A \cap B = \{\quad , \quad\}$

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

Sarah works as a tour guide in Paris.
Her gross pay is €400 per week.

Sarah pays tax at 20%. What is the total tax due each week on her gross pay?

Question 7 **(suggested maximum time: 10 minutes)**

(a) Find the value of $3a + 2b$, where $a = 4$ and $b = 5$.

(b) Simplify $2(x + 4) + 5(x - 2)$.

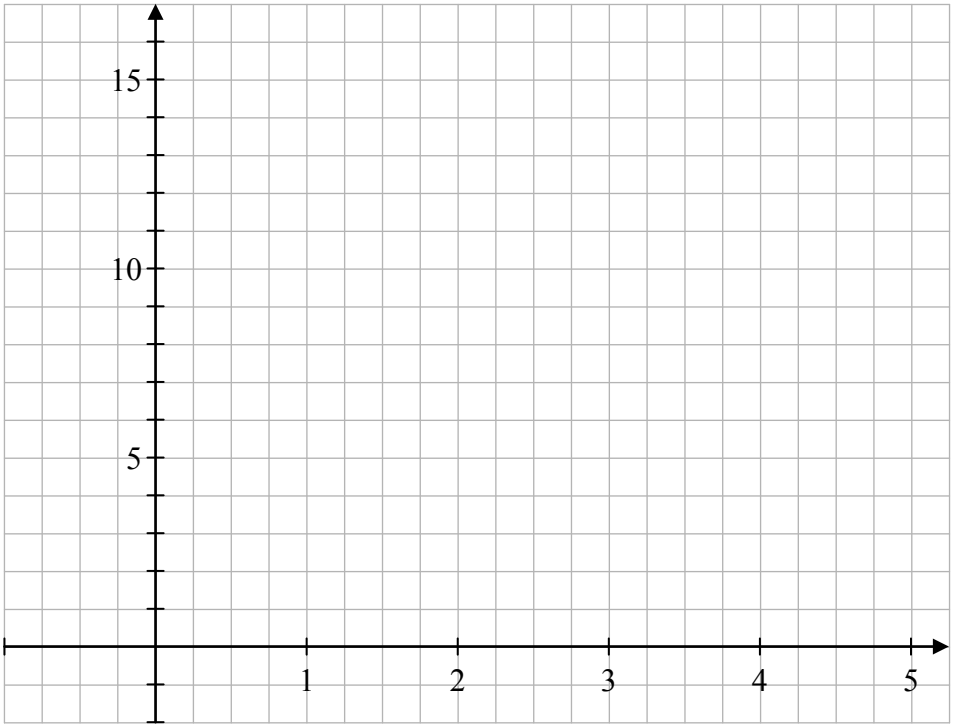
(c) Solve for x: $4x - 2 = 10$.

Question 8 **(suggested maximum time: 10 minutes)**

(a) Given that $y = 2x + 1$, complete the table below.
Show all your work.

x	1	2	3	4	5
y			7		

(b) Using your answers from **(a)**, draw the graph of $y = 2x + 1$ from $x = 1$ to $x = 5$.



(c) Use your graph to find the value of y when $x = 1{\cdot}5$. _____

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.

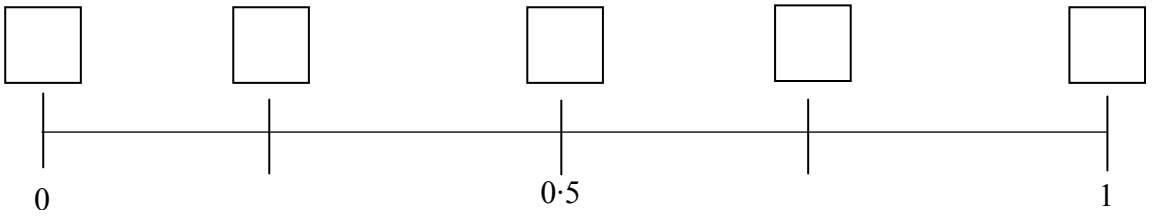
A name is picked at random from a list of 50 girls and 50 boys.
A = A girl's name is picked.

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

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

She takes a button from the box at random.

(b) What is the probability that Sophie will get a black button? _____

(c) 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 Republic of Ireland each year from 1999 to 2009 is given in the table below.

Year	Number of Births
1999	53924
2000	54789
2001	57854
2002	60503
2003	61529
2004	61972
2005	61372
2006	65425
2007	71389
2008	75056
2009	74728

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

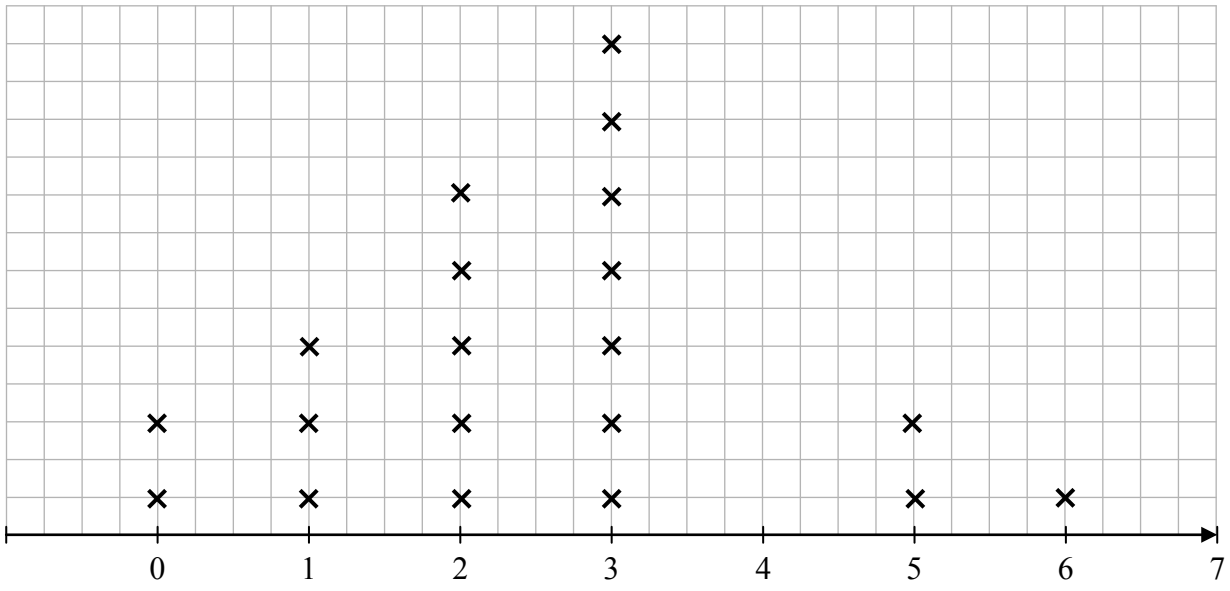
(b) In which years did the birth rate decrease? _____ and _____

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

(e) 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.



(a) What is the **mode** of the data? _____

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

(c) 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

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

(b) One person leaves the squad. A different person joins the squad. Now the **mode** is **Tom**.

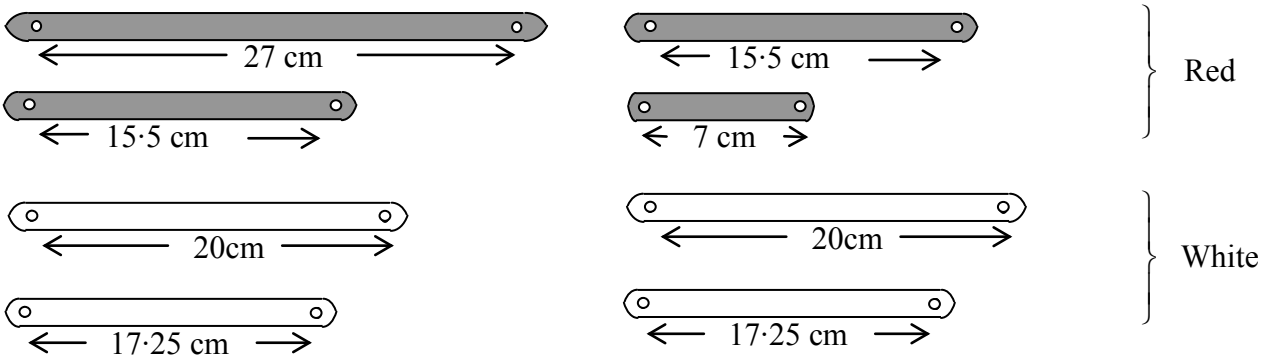
Write the missing names in the sentences below.

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

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

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

Mary and John have a set of red and white plastic strips of various lengths. These strips can be joined together with pins through small holes at their ends.

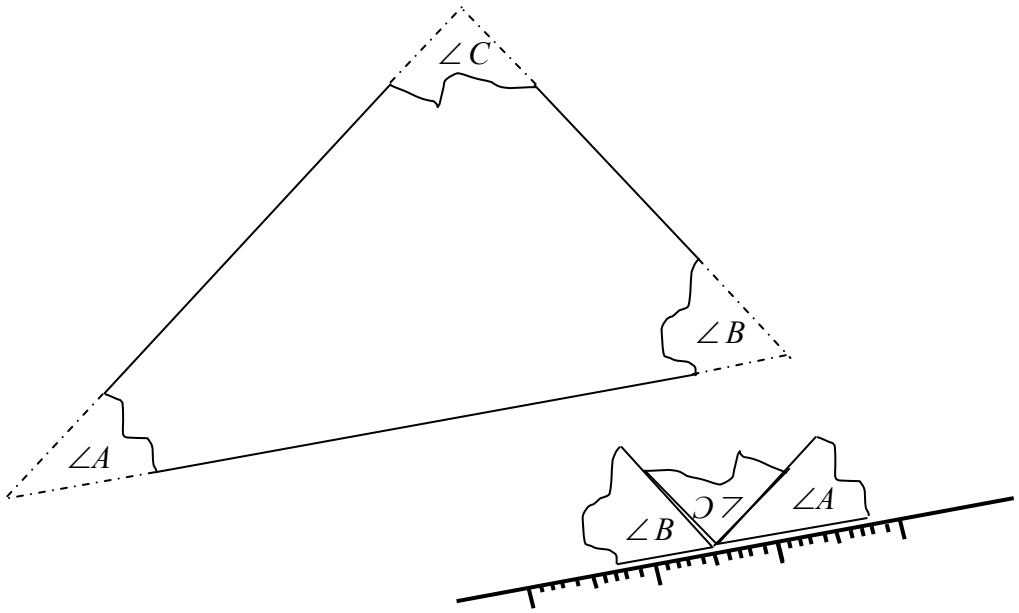


(a) John wants to make an isosceles triangle using three of the four red strips. Can he do this? Give a reason for your answer.

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

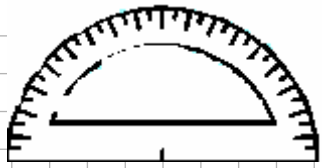
Question 15 **(suggested maximum time: 5 minutes)**

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



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

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

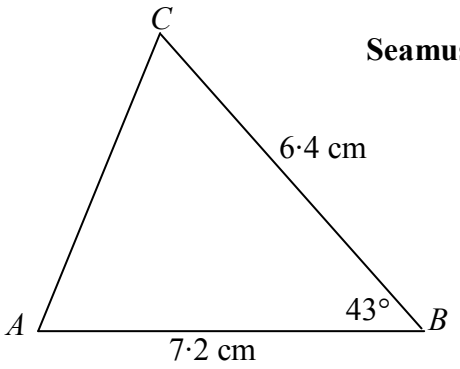


(c) Do the methods above prove that that this result is true for all triangles? Give a reason for your answer.

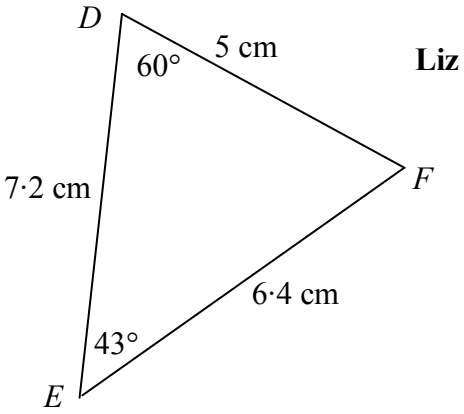
Question 16 **(suggested maximum time: 10 minutes)**

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.

Seamus



Liz



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

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

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

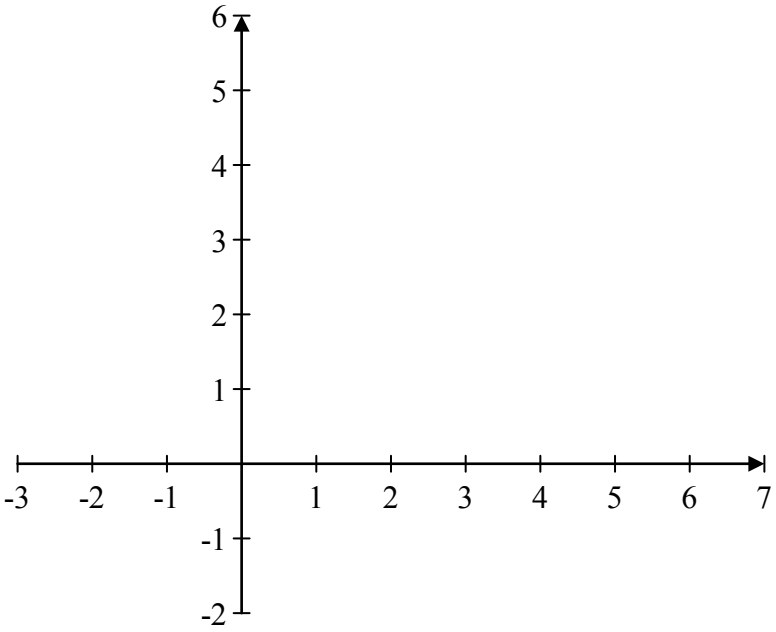
(d) Write the remaining angles and side into Séamus's diagram.

(e) 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 *C* on Séamus's diagram.

1 : 200000

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

(a) Plot the points (-1, 3), (5, 3), (-1, -1) and (5, -1) on the co-ordinate plane below.



(b) Join the four points to form a shape.

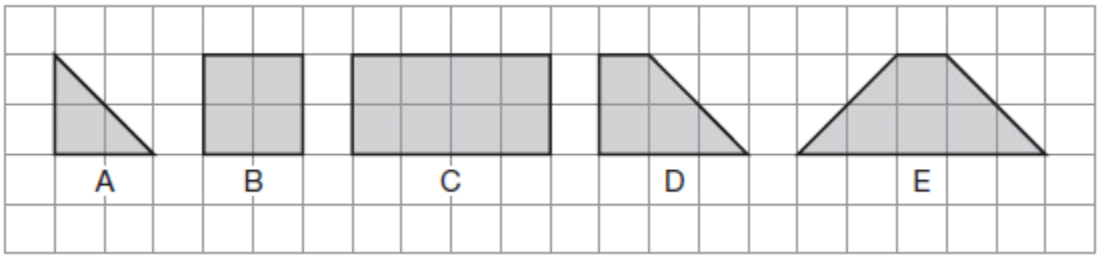
(c) Name the shape. _____

(d) Write down two properties of that shape.

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

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

Look at these five shapes and complete the sentences below.



(a) Shape _____ is the only shape with three sides**.**

(b) Shape _____ is the only one with no right angles.

(c) Shape _____ is the only one with no lines of symmetry.

(d) Shape B is the only shape with four _____**.**

(e) Shape _____ could be formed by joining together two copies of shape _____.

Note to readers of this document:

This sample paper is intended to help teachers and candidates prepare for the June 2011 examination in the *Project Maths* initial schools. The content and structure do not necessarily reflect the 2012 or subsequent examinations in the initial schools or in all other schools.

In the 2011 examination, the material in some questions will be the same as questions on the examination for candidates who are not in the initial schools. On this sample paper, portions of questions from the 2010 examination have been inserted to illustrate.

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

Junior Certificate 2011 – Foundation Level

Mathematics (Project Maths – Phase 1)

Sample Paper
Time: 2 hours