Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination 2017

Mathematics

Foundation Level

Friday 9 June
Afternoon 2:00 – 4:00

300 marks

Examination Number

Centre Stamp

Running Total	

For Examiner					
Q.	Ex.	Adv. Ex.	Q.	Ex.	Adv. Ex.
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.

Write your answers in the spaces provided in this booklet. You may lose marks if you do not do so. You may 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 you do not show all necessary work.

You may lose marks if you do not include the appropriate units of measurement, where relevant.

You may lose marks if you do not give your answers in simplest form, where relevant.

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

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

(a) Write down the value of each of the following.

(i) $101 + 59 =$

(ii) $22 \times 5 =$

(iii) $12{\cdot}6 \div 3 =$

(b) John makes numbers using only the following digits:

$$\mathbf{3},\quad \mathbf{6},\quad \mathbf{1},\quad \mathbf{7}.$$

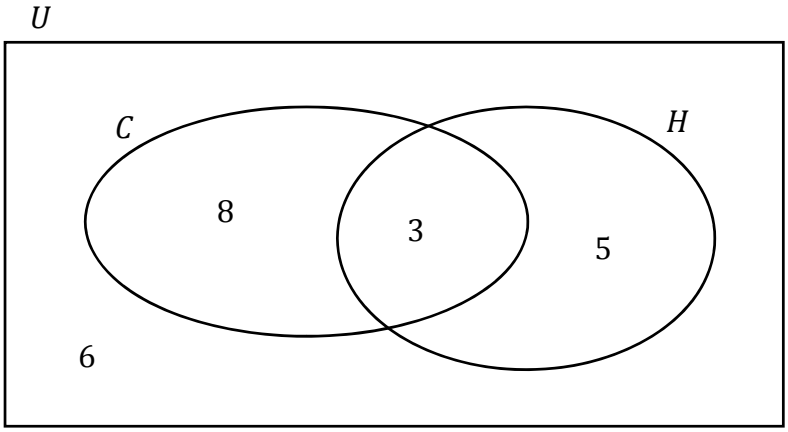
He doesn't use any digit more than once in each number.

(i) Write down the **smallest** 4-digit number that John could make.

(ii) Write down a 3-digit number that is **bigger than 600** that John could make.

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

Ciara carried out a survey on the 22 girls in her class to see how many play Camogie (C) and how many play Hockey (H). Her results are shown in the Venn diagram below.



(a) Use the Venn diagram to complete the sentences below.
The first one has been done for you.

8	girls play Camogie **only**.
	girls play Hockey **only**.
	girls play both Camogie **and** Hockey.
	girls play Camogie **or** Hockey or both.

One girl is picked at random from the 22 girls in Ciara's class.

(b) Find the **probability** that this girl plays Camogie **only**. Give your answer as a fraction.

Answer = $\frac{\quad}{\quad}$

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

List the elements of each of the following sets.

(a) S is the set of letters in the word **TABLE**.

$S = \{ \quad , \quad , \quad , \quad , \quad \}$

(b) T is the set of **odd numbers** between 6 and 12.

$T = \{ \qquad \}$

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

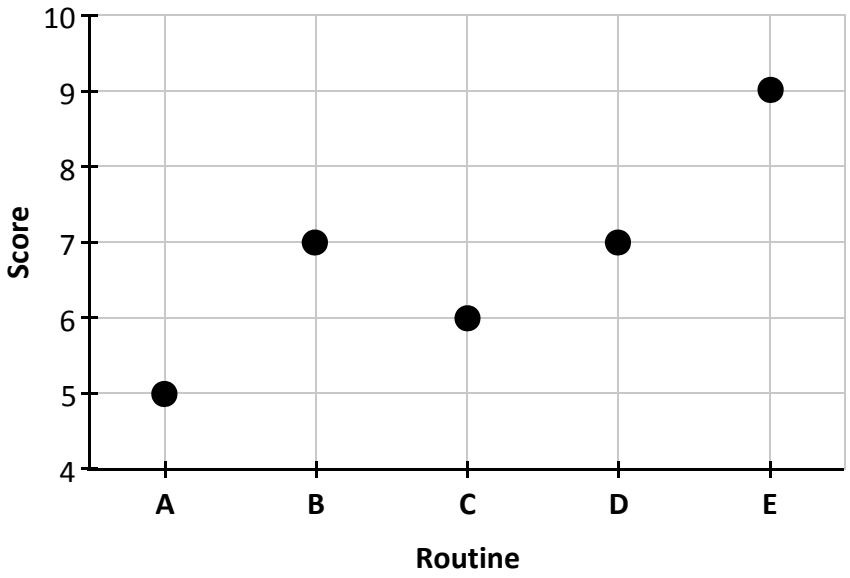
(a) Find the value of $4a + 3b$, when $a = 2$ and $b = 7$.

(b) Solve the equation $2x - 4 = 14$.

previous	page	running

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

The graph below shows the score that Sophie got in each of her five gymnastics routines.



(a) Write down the score that Sophie got in Routine **A**.

Score = ☐

(b) Write one of the letters **A**, **B**, **C**, **D**, or **E** into the box below to complete the sentence correctly:

"Sophie got her **highest** score in Routine ☐ ."

(c) Write down Sophie's **modal** (most common) score.

Mode = ☐

(d) Work out Sophie's **mean** (average) score. Show all of your work.

Question 6 **(Suggested maximum time: 10 minutes)**

Simon bought 100 cartons of orange juice. He sold 80 of the cartons.
The rest of the cartons were damaged, so he could not sell them.

(a) Find the number of cartons that were damaged.

Simon sold the 80 cartons for $€0{\cdot}75$ each.

(b) Find how much money Simon got for the 80 cartons.

$80 \times 0{\cdot}75 = €$

Simon paid $€50$ in total for the cartons of orange juice.

(c) Find Simon's **profit** from selling the cartons.

(d) Find Simon's **profit** as a **percentage** of $€50$ (the cost price).

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

Ms Kelleher gave the students in her class a science exam.
The grades of the students in the exam are shown below.

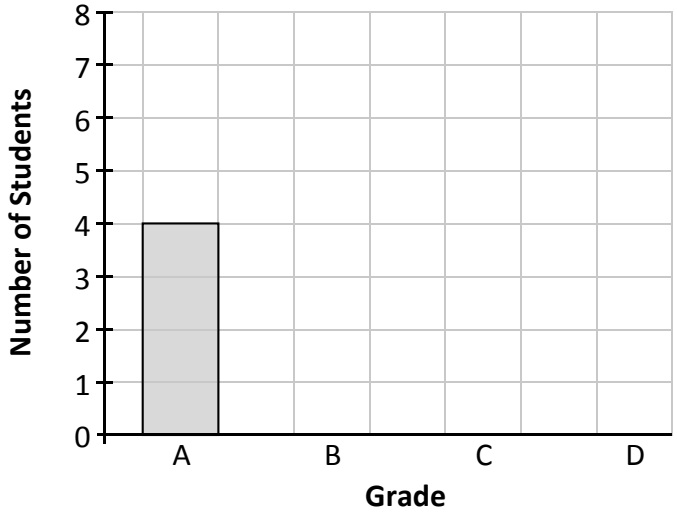
C	B	B	D	C
D	C	C	B	A
D	A	A	C	D
B	C	A	C	B

(a) Find the **total** number of students who took the exam.

(b) Complete the frequency table below to show the grades of the students in the exam.

Grade	A	B	C	D
Number of Students				

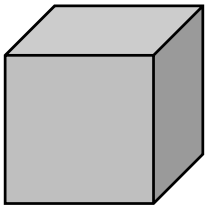
(c) Complete the **bar chart** below to show the grades of the students in the exam.

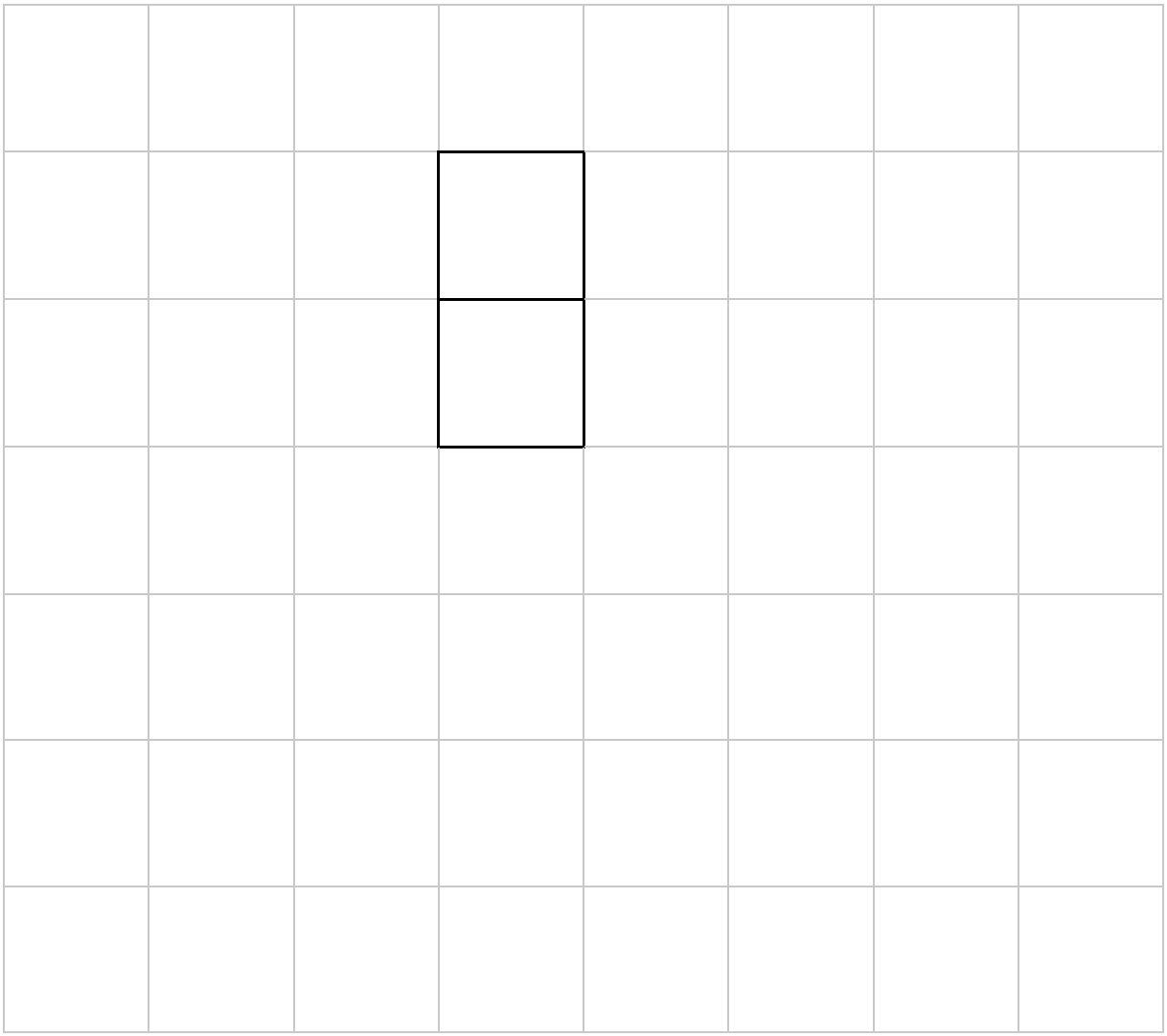


Question 8 **(Suggested maximum time: 5 minutes)**

The diagram below shows part of a **net** of a cube.

Complete the net of the cube, as accurately as you can.



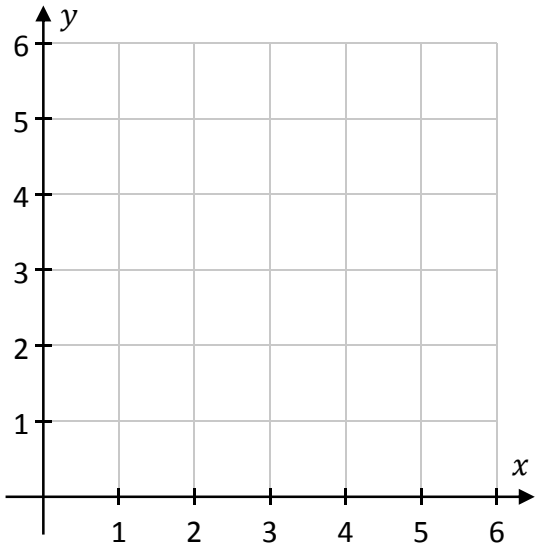


Question 9 **(Suggested maximum time: 5 minutes)**

(a) **Plot** the following two points on the co-ordinate diagram below.
Label each point clearly.

$$K = (5, 3)$$

$$L = (1, 5)$$



(b) Find the co-ordinates of the **midpoint** of $[KL]$.

Midpoint = (,)

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

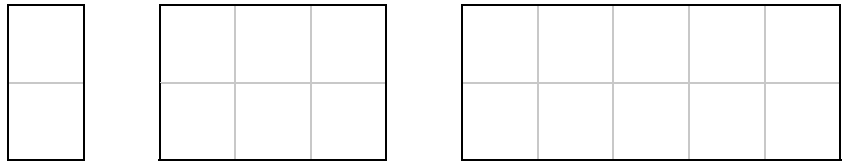
The table below shows a function.
This function takes a **shape** as an input. The output is the **number of sides** of that shape.

Fill in the missing input and the two missing outputs in the table.

Input: **Shape**	Output: **Number of sides**
Pentagon	5
Square	
Hexagon	
	3

Question 11 **(Suggested maximum time: 10 minutes)**

The first three stages of a pattern are shown below.



Stage 1 **Stage 2** **Stage 3**

(a) **Draw** the next stage of the pattern.

(b) Fill in the four missing values in the table below to show the height, the length, and the area of each of the first four stages in the pattern.

	Height (units)	**Length** (units)	**Area** (square units)
Stage 1	2	1	$2 \times 1 = 2$
Stage 2	2	3	$2 \times 3 = 6$
Stage 3	2		
Stage 4	2		

(c) The lengths of four other stages in the pattern are:

$$11, \quad 13, \quad 15, \quad 17.$$

Do these numbers follow a **linear** pattern or a **quadratic** pattern?
Give a reason for your answer.

These numbers follow a: (Tick (✓) **one** box only)

linear pattern ❑ **quadratic** pattern ❑

Reason:

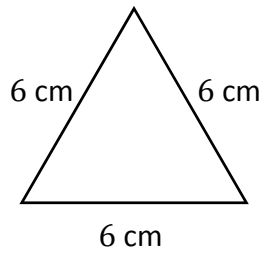
Question 12 **(Suggested maximum time: 5 minutes)**

(a) Simplify $5w - 2w + 3y + 6y$.

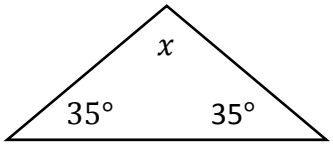
(b) Multiply out $5(a + 2b - 1)$.

Question 13 **(Suggested maximum time: 15 minutes)**

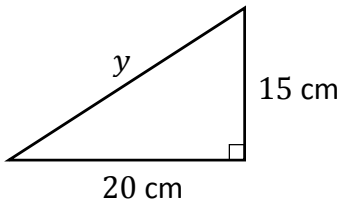
Three triangles, **A**, **B**, and **C**, are shown below.



A



B



C

(a) Write the correct letter in each space in the table below to show what type of triangle each one is. Use each letter only **once**.

Type of Triangle	**Triangle** (**A**, **B**, or **C**)
Right-angled	
Equilateral	
Isosceles	

(b) Find the length of the **perimeter** of Triangle **A** above.

(c) Work out the size of the angle marked x in Triangle **B** above.
Remember that the other angles are both $35°$.

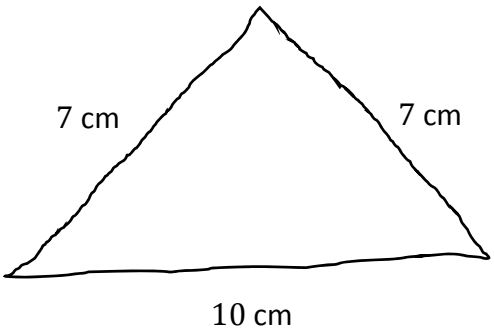
(d) Use the theorem of **Pythagoras** to find the length of the side marked y in Triangle **C**. Remember that the other sides are 15 cm and 20 cm in length.

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

Draw the **axis of symmetry** of the following shape.

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

(a) The sketch below shows a triangle with sides of length 7 cm, 7 cm, and 10 cm.



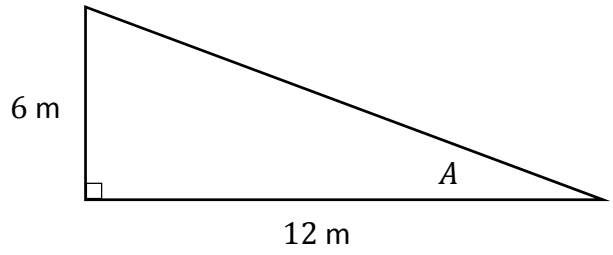
(i) **Construct** this triangle in the space below. Show all of your construction lines clearly.

The triangle is a scaled diagram of part of a roof. The scale is $\mathbf{1\ cm = 2\ m}$.

(ii) Use this fact to fill in the two missing values in the table below.

	Length on the **Diagram** (cm)	**Actual** Length (m)
Side	7	14
Base	10	
Perimeter	24	

(b) The diagram below shows another part of the roof.
It is in the shape of a right-angled triangle. One of the angles is marked A.



(i) Use the lengths of the sides of this triangle to write down the value of $\mathbf{\tan A}$.

$$\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{\quad}{\quad}$$

(ii) Hence use a calculator to work out the **size** of the **angle** A.
Give your answer correct to the nearest degree.

You may use this page for extra work.
Label any extra work clearly with the question number and part.

You may use this page for extra work.
Label any extra work clearly with the question number and part.

Junior Certificate 2017 – Foundation Level

Mathematics

Friday 9 June

Afternoon 2:00 – 4:00