



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination 2019

Mathematics

Foundation Level

Friday 7 June
Afternoon 2:00 to 4:00

300 marks

Examination Number

Centre Stamp

Running Total	
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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. 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 may lose marks if your solutions do not include supporting 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:

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Question 1 (Suggested maximum time: 5 minutes)

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(a) Find the value of each of the following.

(i) $256 + 73 =$

--

(ii) $351 \div 3 =$

--

(iii) $2^3 =$

--

[illegible]

(b) (i) Which of the following numbers is 10 times bigger than 708?

7800

7008

780

7080

Answer:

--

(ii) Which of the following is 100 times smaller than 3000?

3

30

300

300 000

Answer:

--

[illegible]

Question 2 (Suggested maximum time: 5 minutes)

Question 2 (Suggested maximum time: 5 minutes)

Fill in the missing number in each of the following identities.

(a) 3 hours = minutes.

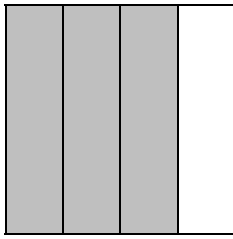
(b) 77 days = weeks.

(c) 72 hours = days.

Question 3

(Suggested maximum time: 5 minutes)

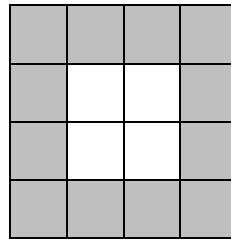
- (a) The four squares below are labelled **A**, **B**, **C**, and **D**. Part of each square is shaded.



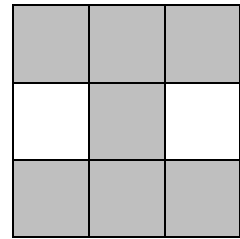
A



B



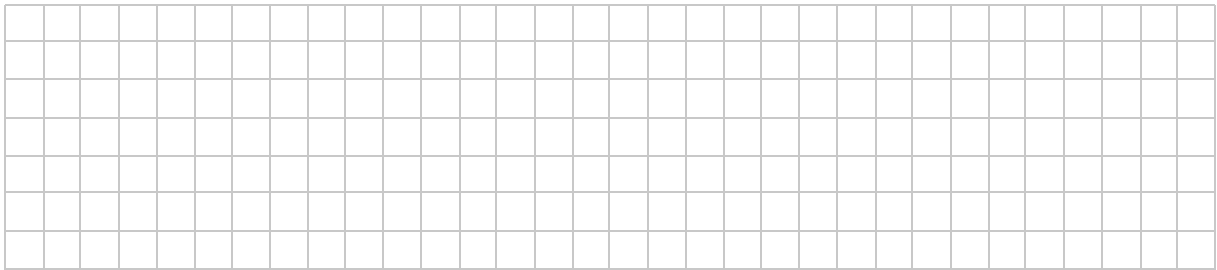
C



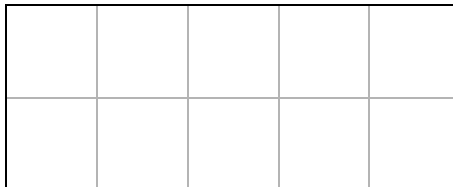
D

Write a correct letter (**A**, **B**, **C**, or **D**) into each space below to show which two squares have $\frac{3}{4}$ of their area shaded.

“Squares and have $\frac{3}{4}$ of their area shaded.”



- (b) Shade in $\frac{3}{5}$ of the following rectangle, which is broken into 10 small squares.



Question 4 (Suggested maximum time: 10 minutes)

Question 4 (Suggested maximum time: 10 minutes)

The table below shows part of a train timetable from Cork to Dublin.

		Time						
Cork	depart	12:00	12:30	13:30	14:00	14:30	15:30	16:00
Dublin	arrive	14:36	15:07	16:05	16:35	17:06	18:08	18:40

- (a) How long does the 12:00 train take to get from Cork to Dublin?
Give your answer in hours and minutes.

[illegible]

- (b)** Tara is getting a train from Cork to Dublin. She needs to be in Dublin by 17:30. What is the **latest** time that Tara can leave Cork by train?

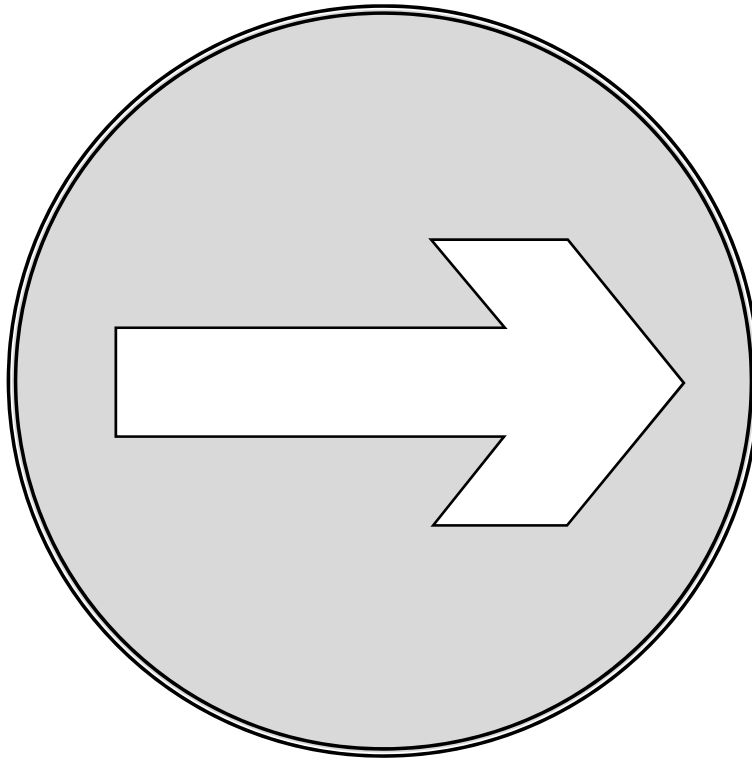
Answer:

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- (c)** The early morning train from Cork to Dublin takes $2\frac{1}{2}$ hours. It travels 250 km in this time.

Work out the **average speed** of this train, in km per hour.

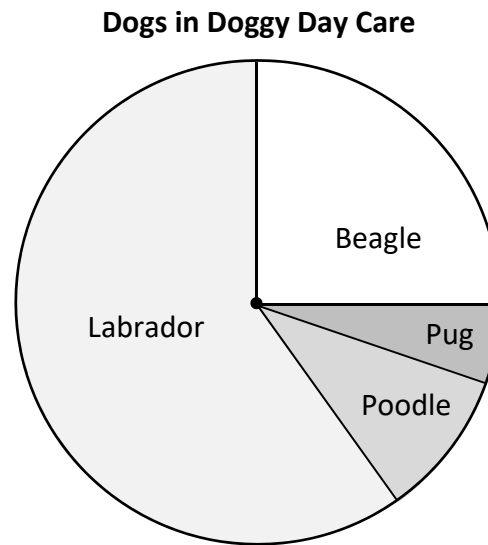
(d) Draw the **axis of symmetry** of the following road sign.



Question 5 (Suggested maximum time: 5 minutes)

Question 5 (Suggested maximum time: 5 minutes)

The graph below shows the proportion of each different type of dog in Doggy Day Care on a particular day.



- (a)** Put a tick (✓) in the correct box to show whether each of the following statements is true or false. For each statement, tick **one** box only.

True

False

- (i) The graph above is a bar chart.
- (ii) Over half the dogs were Labradors.
- (iii) There were more Pugs than Beagles.

□ □ □

□ □ □

- (b)** In total, there were 20 dogs in Doggy Day Care on that day.

Use this information to estimate the number of Beagles on that day.
Show your working out, or give a reason for your answer.

Answer:

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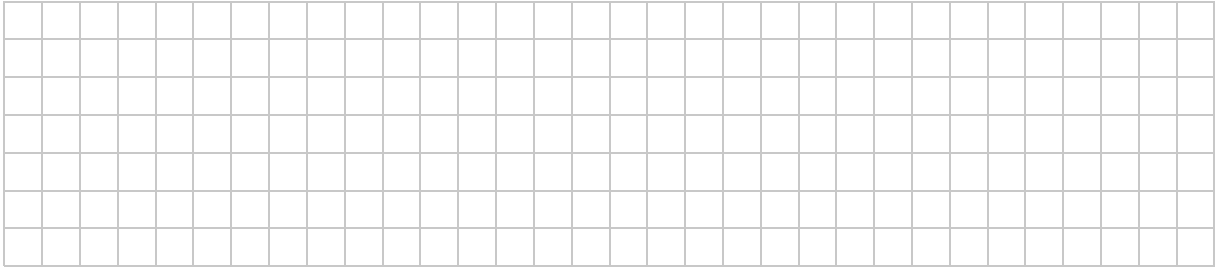
Working out / Reason:

[illegible]

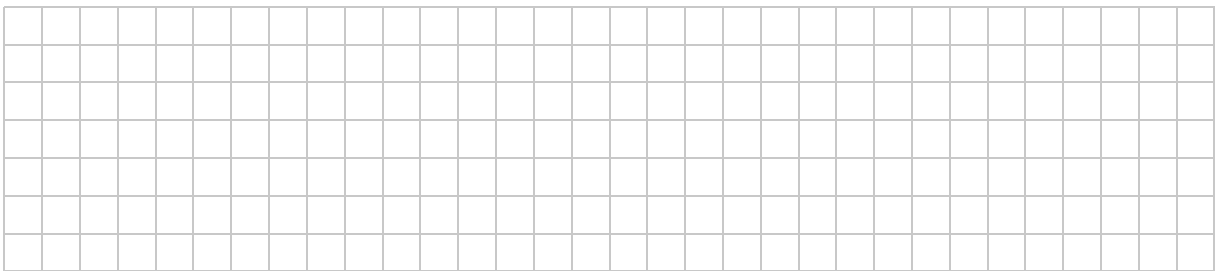
Question 6**(Suggested maximum time: 5 minutes)**

Two of the angles in a triangle are 80° and 40° . The third angle is A .

- (a) Work out the size of the angle A .

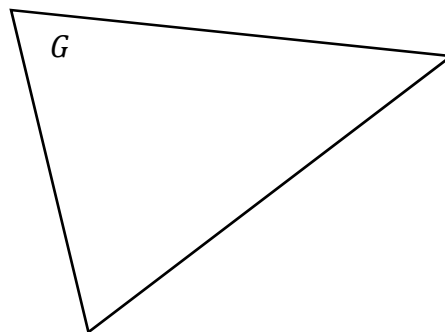


- (b) Gina says that this triangle is equilateral.
Explain why Gina is **not** correct.



Gina draws the diagram below to show another triangle. One of the angles is G .

Gina's diagram



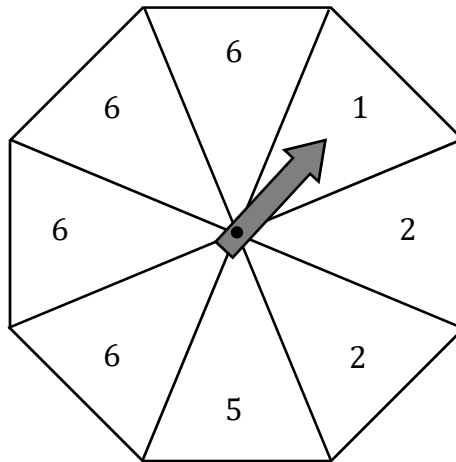
- (c) Use a protractor to **measure** the size of the angle G in Gina's diagram.

Answer:

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

Luke has a fair spinner with 8 sectors. It is shown in the diagram below.
Luke spins the pointer on the spinner.



Write the correct term from the following list into the appropriate space in the table below to describe how likely it is that each event happens. Use each term only once.

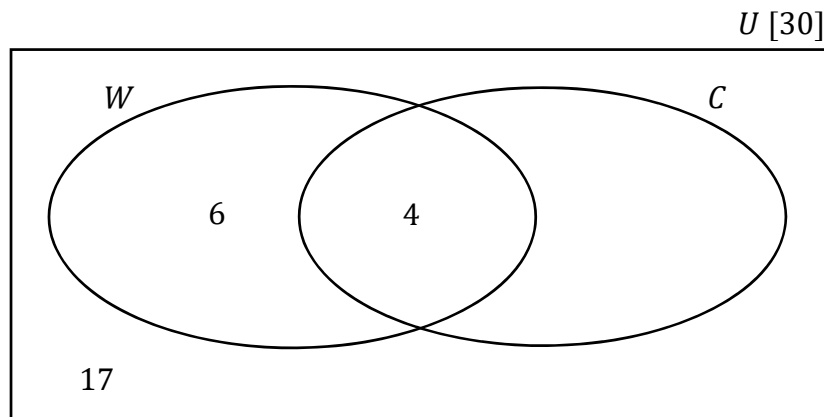
Certain**Equal chance****Unlikely****Impossible**

Event	How likely is the event?
He will get the number 3.	
He will get the number 6.	
He will get the number 5.	
He will get a number less than 7.	

Question 8 (Suggested maximum time: 5 minutes)

Question 8 (Suggested maximum time: 5 minutes)

As part of a survey, the 30 students in a class (U) were asked if they walk (W) or cycle (C) to school. Some of the results are shown in the Venn diagram below.



- (a) Complete the Venn diagram by filling in the **one** missing entry. Remember that there were 30 students in total in the class.

- (b)** In total, how many students in the class **walk** to school?

- (c)** Explain what the following statement means, in the context of the survey:

$$\# C = 7$$

Question 9 (Suggested maximum time: 10 minutes)

Question 9 (Suggested maximum time: 10 minutes)

Gerry carried out a survey on the hair colour of the 12 students in his class.

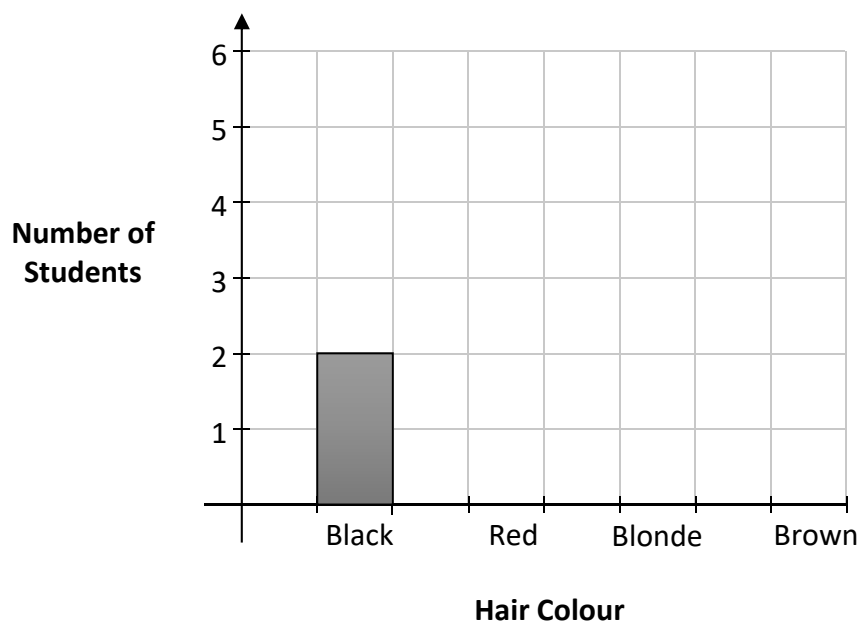
The colour of each person's hair is shown in this table:

Black	Red	Blonde	Brown
Brown	Blonde	Brown	Brown
Black	Brown	Blonde	Red

- (a)** Complete the following table by writing in the number of students with each hair colour.

Hair Colour	Black	Red	Blonde	Brown
Number of Students	2			

- (b)** Complete the bar chart on the axes below to show this information.



- (c)** What was the **modal** [most common] hair colour?

Modal colour:

--

- (d) Eoghan was one of the 12 students surveyed. What is the **probability** that he has **black** hair?

Answer:

- (e) What **percentage** of the students surveyed had **blonde** hair?

[illegible]

There are 20 students in Aoibheann's class. 15% of them have hair extensions.

- (f)** Work out the number of students in Aoibheann's class who have hair extensions.

[illegible]

Question 10

(Suggested maximum time: 15 minutes)

On the right is a photo of a 3D jigsaw of the Eiffel Tower.

The jigsaw is made to scale.

- (a) Using your ruler, measure the **width (W)** and the **height (H)** of the jigsaw in the photo.

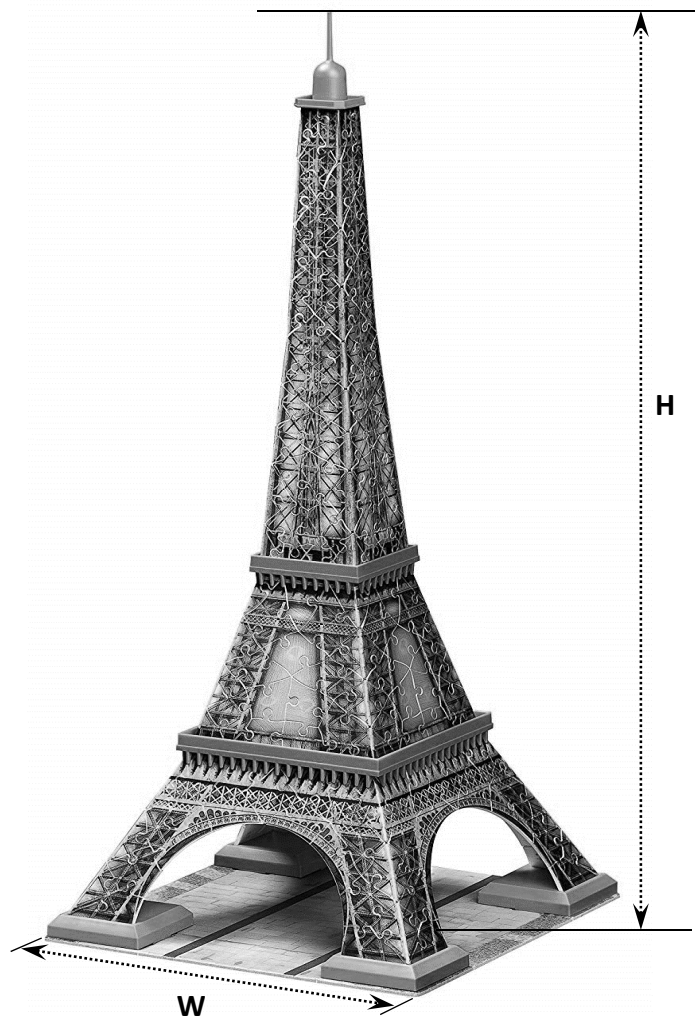
Give each answer in cm,
correct to the nearest cm.

Width, **W** =  cm

Height, **H** = cm

- (b)** The **actual width** of the **real** Eiffel Tower is 125 m.
- Use this fact to work out the **actual height** of the **real** Eiffel Tower.

Actual height = m

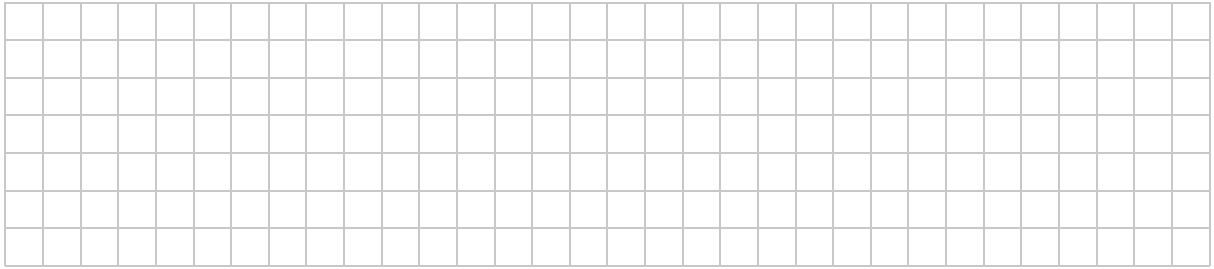


- (c) Give one reason why your answer to part (b) might **not** be the exact actual height of the real Eiffel Tower.

[illegible]

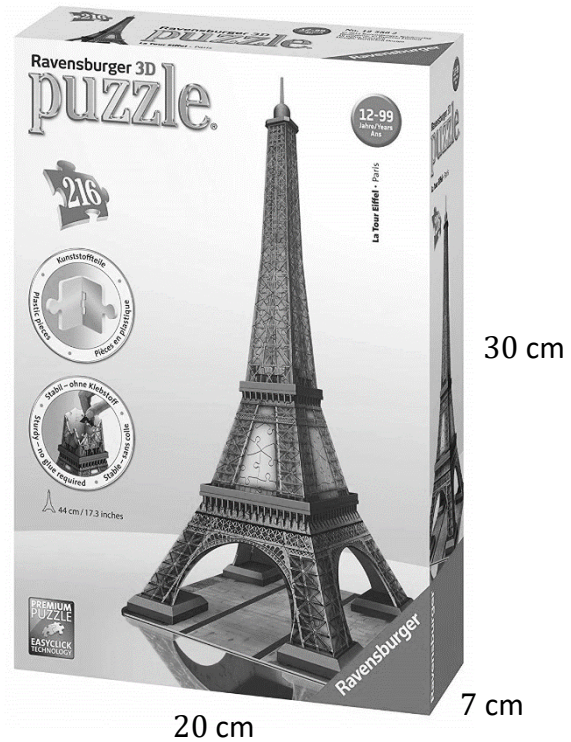
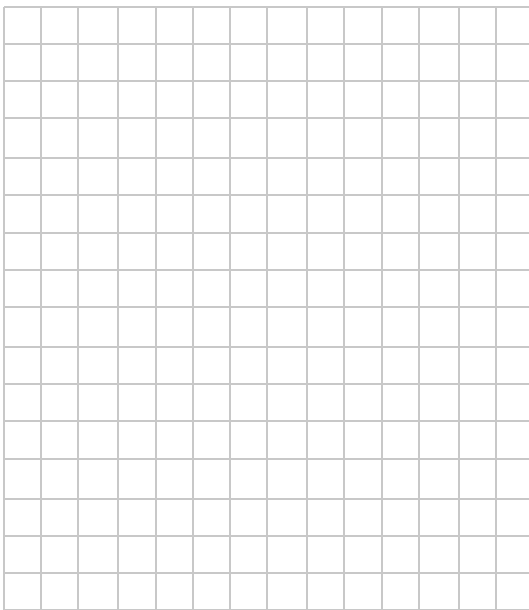
The jigsaw has a **square base** with sides of length 17 cm.

- (d) Work out the **area** of the square base of the jigsaw.



- (e) The jigsaw is sold in a rectangular box measuring 20 cm by 30 cm by 7 cm.

Work out the **volume** of this box.



- (f) John buys the jigsaw online for £18 sterling.
The exchange rate is €1 = £0.89 sterling.

Work out the price of the jigsaw in euro (€). Give your answer correct to two decimal places.

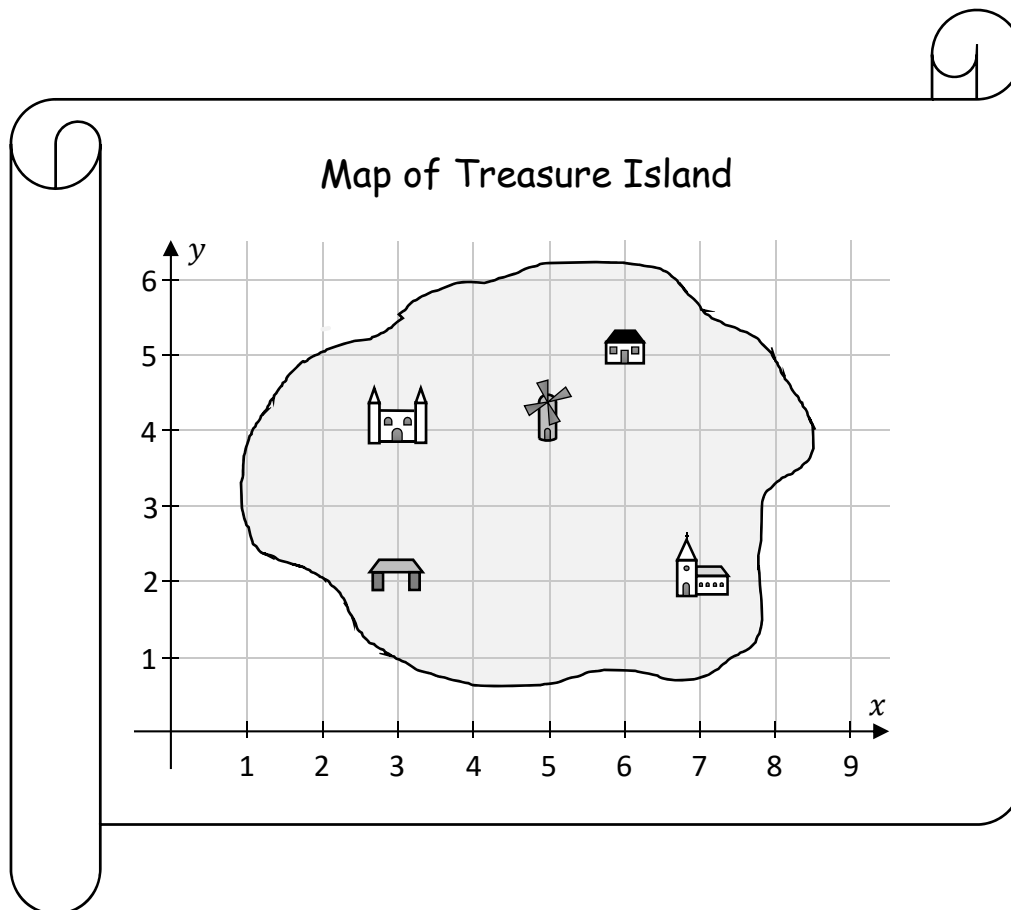


Source of the images: www.ravensburger.org. Altered.

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

A map of Treasure Island is shown below, with the following five buildings marked:

				
shed	castle	church	house	windmill



(a) In the table below, write in the co-ordinates of each building. One has been done already.

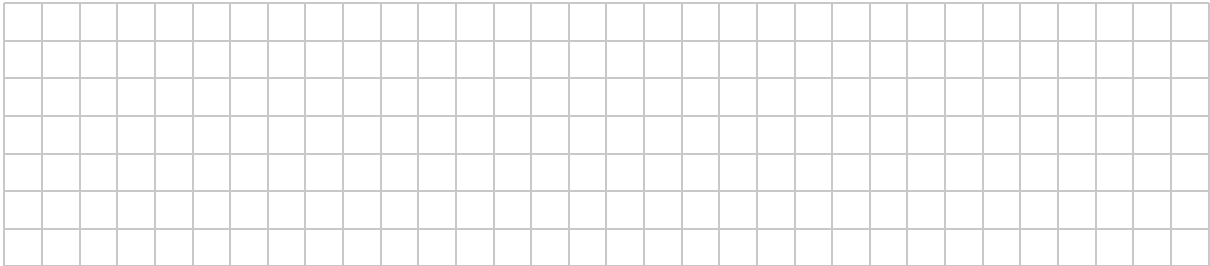
Building	Co-ordinates
	(5 , 4)
	(,)
	(,)

- (b) In the table below, write in which building is at each of the given co-ordinates. One has been done already.

Co-ordinates	Building
(5, 4)	windmill
(3, 2)	
(6, 5)	

- (c) Stephen is at the point (4, 3).
Plot this point on the map. **Label** this point **S**.
- (d) Use the map to complete the following sentence correctly.
 You can write in the co-ordinates of the building, **or** which building it is.

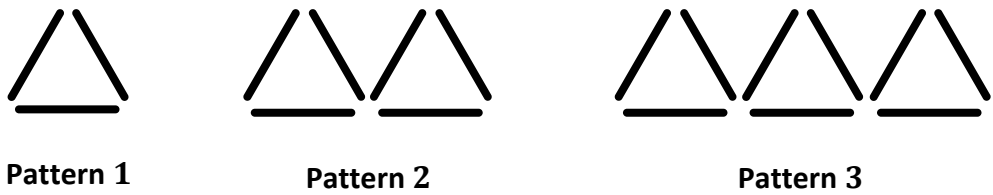
“Stephen is at the midpoint between the windmill at (5, 4) and .”



Question 12

(Suggested maximum time: 10 minutes)

Ella makes a sequence of patterns using sticks.
There are a certain number of triangles in each pattern.
The first 3 patterns are shown below.



(a) Draw Pattern 4, the next pattern in the sequence.

(b) Fill in the missing values in the table below to show how many triangles and how many sticks are in each of the given patterns in the sequence. Give your answers in the last line in terms of n , where $n \in \mathbb{N}$.

Pattern	Number of Triangles	Number of Sticks
1	1	3
2	2	6
3	3	
4		
5		
n		

- (c)** Fill in the missing number to complete the following sentence correctly:

“There are 33 sticks in Pattern	in the sequence.”
---------------------------------	-------------------

[illegible]

- (d)** There are 294 sticks in one pattern in the sequence.

Work out the number of sticks in the **next** pattern.

[illegible]

- (e)** In a different sequence, Pattern x has $x^2 + 1$ sticks, where $x \in \mathbb{N}$.

Work out the number of sticks in Pattern 6 of this sequence (that is, when $x = 6$).

Question 13 (Suggested maximum time: 5 minutes)

Question 13 (Suggested maximum time: 5 minutes)

Ayesha needs to choose 3 subjects to study for the Leaving Certificate.

She must choose **one subject from each group** from the table below.

For example, Ayesha could choose: Business, History, and Biology.

Group 1	Group 2	Group 3
• Business • Music • Chemistry • Construction	• Physics • History • Art • Economics • Geography	• Biology • Accounting • D.C.G. • Latin

- (a)** Write down **two** more examples of 3 subjects that Ayesha could choose.

-

Example 1:

-

Example 2:

- (b)** Work out the **total** number of different possible choices of 3 subjects that Ayesha could make.

Question 14

(Suggested maximum time: 10 minutes)

(a) Simplify:

$$4a + 6b + 7b - a$$

[illegible]

(b) Factorise:

$$3e^2 + 12e$$

One of the factors is $3e$.

$$3e^2 + 12e = 3e (\quad)$$

$$3e^2 + 12e = 3e (\quad)$$

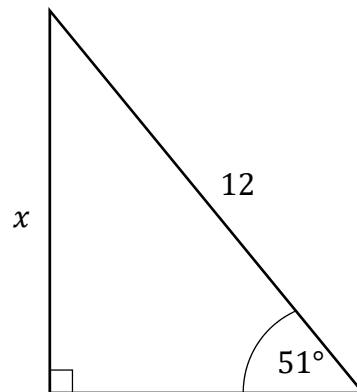
(c) Solve the equation:

$$7n - 11 = 45$$

Question 15

(Suggested maximum time: 5 minutes)

The diagram below shows a right-angled triangle.
The sizes of some sides and angles are marked.

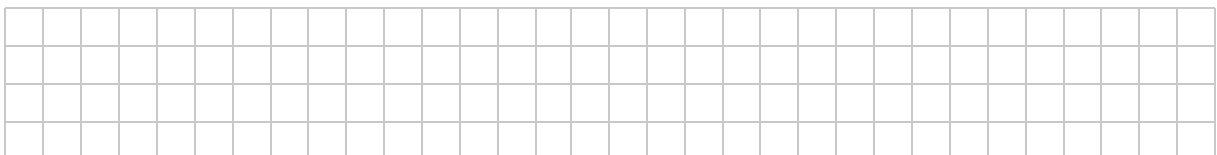


- (a) Using the diagram, write $\sin 51^\circ$ as a fraction in terms of x .

$$\sin 51^\circ = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{\boxed{}}{\boxed{}}$$

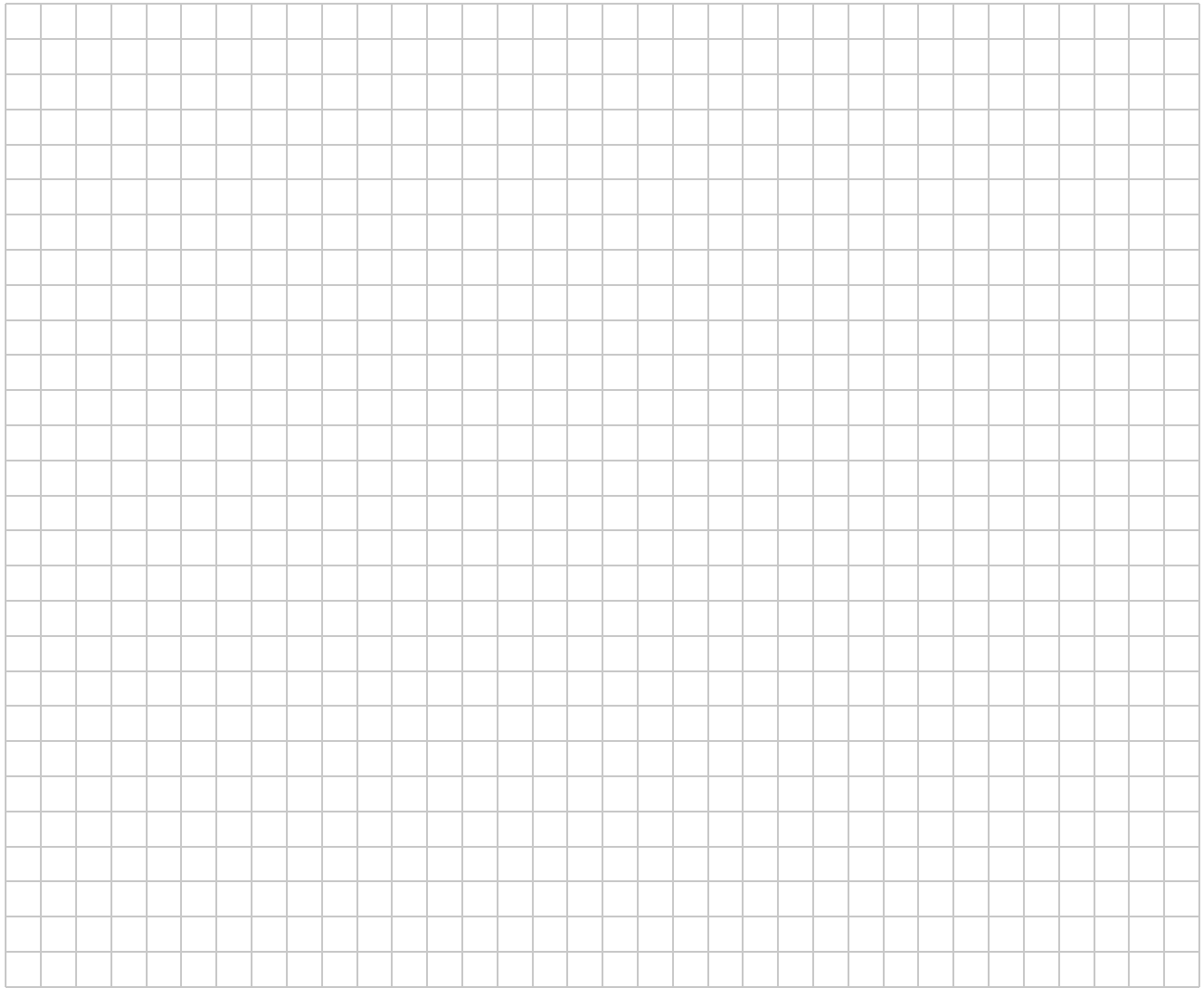
- (b) Using a **calculator**, find the value of $\sin 51^\circ$.
Give your answer correct to one decimal place.

$$\sin 51^\circ = \boxed{}$$



Page for extra work.

Label any extra work clearly with the question number and part.



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