



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination 2018

Mathematics

Foundation Level

Friday 8 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					
6					
7					
8					
9					
10			Total		

Grade

Instructions

There are 14 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)

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

(i) $12 + 67 =$

--

(ii) $234 - 86 =$

--

(iii) $8.4 \times 3 =$

--

[illegible]

(b) The tables below show two thermometers, **A** and **B**. Each thermometer shows the temperature in $^{\circ}\text{C}$. Fill in the tables.

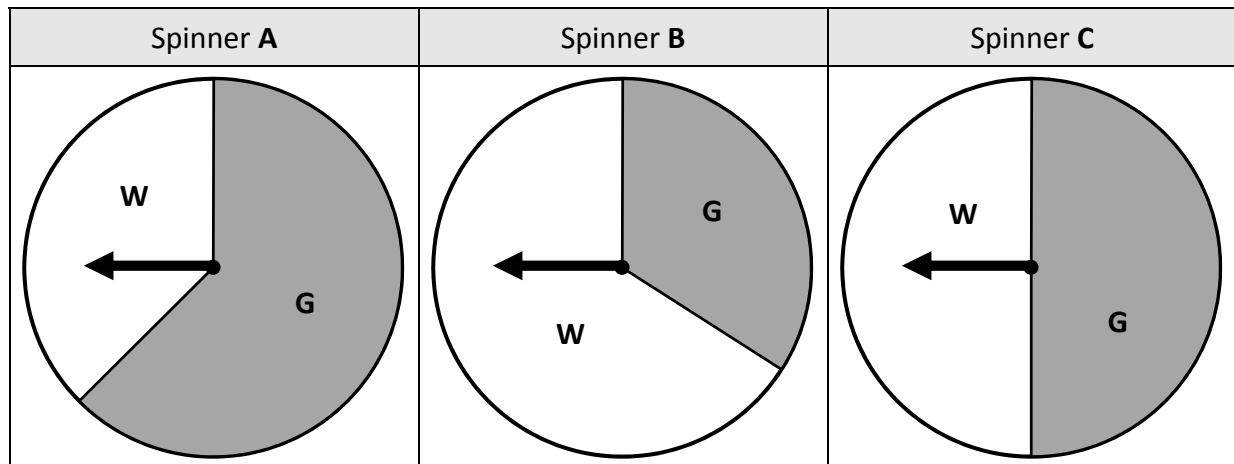
[illegible][illegible]

Question 2 (Suggested maximum time: 5 minutes)

Question 2 (Suggested maximum time: 5 minutes)

The diagrams below show three fair spinners, **A**, **B**, and **C**.

Each spinner has a white sector (**W**) and a grey sector (**G**).



- (a) Which spinner has the **highest** probability of stopping on the **white** sector (**W**)? Give a reason for your answer.

Answer:	
Reason:	

- (b)** Spinner **C** was used **80 times** in a game.
Estimate how many times it stopped on the **white** sector (**W**).

[illegible]

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

The table shows the number of text messages Conor sent each day for two weeks.

18	18	19	19	19	23	24
26	26	28	31	32	33	59

(a) Fill in the **stem and leaf** plot to show this information.

1						
2						
3						
4						
5						

Key:

1	8
---	---

 = 18 text messages

- (b)** Write down the **modal** (most common) number of text messages Conor sent.

Mode =

- (c) Work out the **median** number of text messages Conor sent over the two weeks.

A large grid of graph paper with 20 columns and 10 rows. The grid is composed of small squares, with a slightly larger square at the top left corner, likely for a title or header. The grid is empty and ready for use.

- (d)** Conor spent one of these days organising a party.

How many text messages do you think Conor sent on this day?

Give a reason for your answer.

Answer:	
Reason:	

Question 5 (Suggested maximum time: 5 minutes)

Question 5 (Suggested maximum time: 5 minutes)

Anika needs to buy five items in a shop. She estimates their total cost by rounding each item to the nearest euro, and then finding the sum of these values.

(a) Fill in the table to show the **estimated cost** for each item and the **estimated total cost**.

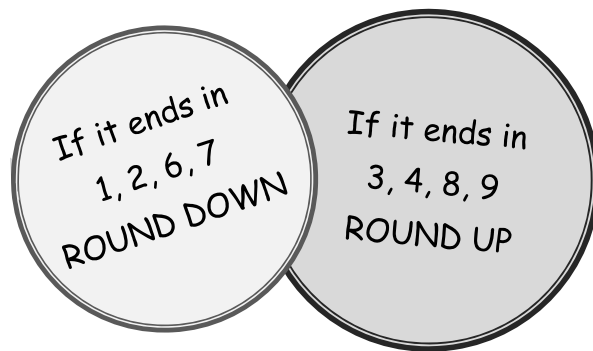
Item	Actual Cost	Estimated cost (correct to the nearest euro)
Ruler	€1.75	
Pencil Case	€4.20	
Geometry Set	€4.99	
Notebook	€1.80	
Markers	€2.30	
Estimated Total Cost:		

[illegible]

(b) Work out the **actual total cost** of the five items.

[illegible]

- (c) Anika also buys a magazine. The total cost is €18.03. She pays with a €20 note. The shopkeeper rounds her change to the nearest 5 cent. Work out the **change** that Anika will get.



Question 6 (Suggested maximum time: 5 minutes)

Question 6 (Suggested maximum time: 5 minutes)

Keith's gross income is €420 per week. Keith pays income tax at a rate of 20%.

- (a)** Work out Keith's gross tax per week.

Gross Tax = $0.20 \times \text{€}420 =$

Keith has a tax credit of €65 per week.

- (b)** Work out Keith's net tax per week.

$$\text{Net Tax} = \text{Gross Tax} - \text{Tax Credit}$$

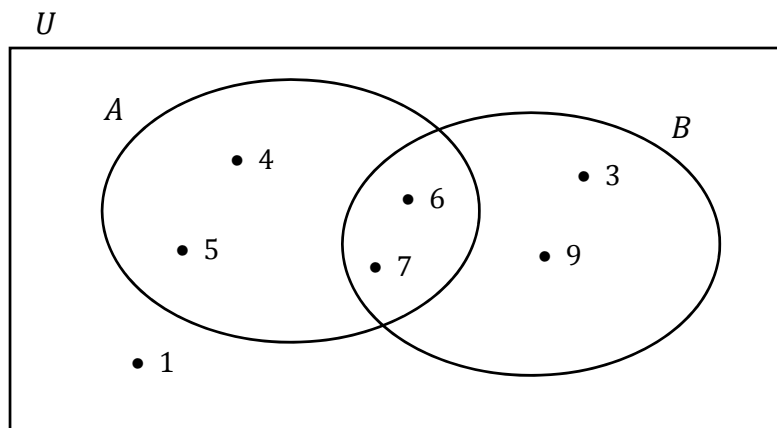
- (c)** Work out Keith's net income per week.

$$\text{Net Income} = \text{Gross Income} - \text{Net Tax}$$

Question 7

(Suggested maximum time: 5 minutes)

The diagram below shows the sets A , B , and U .



- (a) Put a tick (✓) in the correct box to show what kind of diagram this is.
Tick **one** box only.

Tree diagram

☐

Venn diagram

☐

Pie diagram

☐

- (b) Put a tick (✓) in the correct box to show which set has **exactly 2 elements**.
Tick **one** box only.

$A \cup B$

☐

A

☐

$A \cap B$

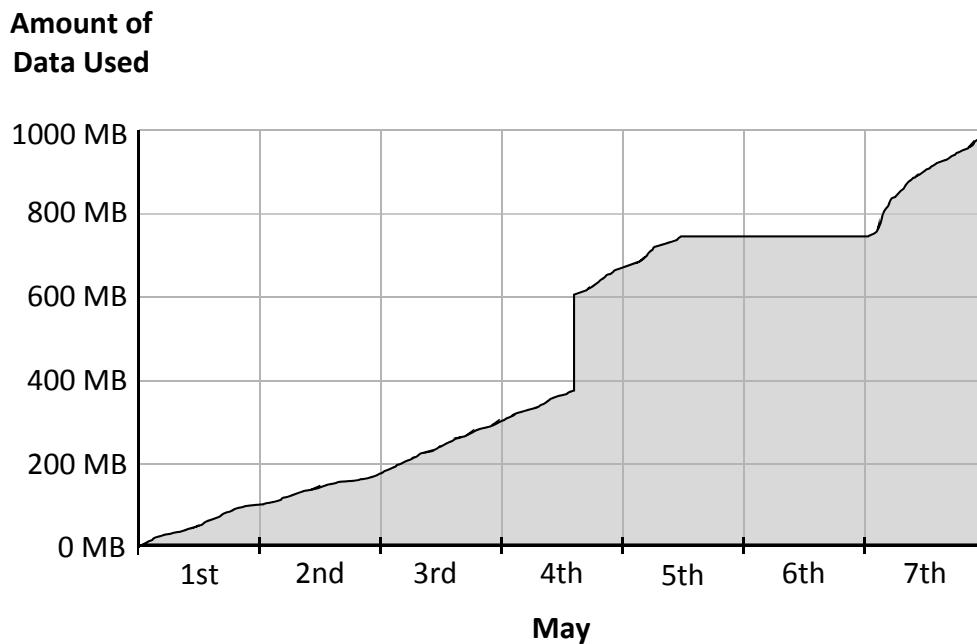
☐

- (c) List the elements in the set B .

$B = \{ \quad \quad \quad \}$

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

The diagram below shows the amount of data that Ava used on her phone over the first 7 days in May. She used 1000 MB in total in this time.

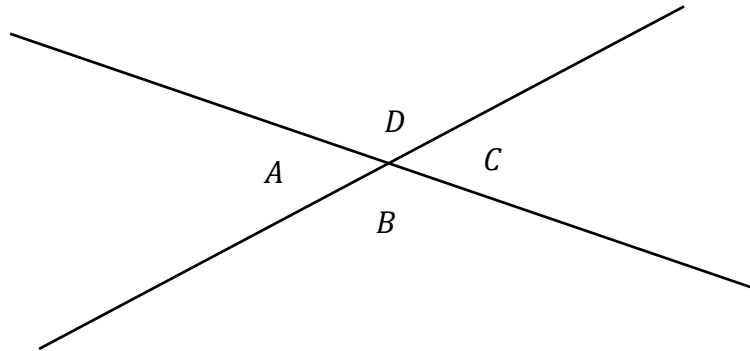


Use the diagram to complete the table below by filling in the missing number and dates.

Description	Number or date
The number of MB of data Ava had used by the end of 2nd May.	
The date when Ava used the most data.	
The date when Ava didn't use any data.	

Question 9**(Suggested maximum time: 10 minutes)**

- (a)** The diagram below shows two lines. Four angles are labelled.



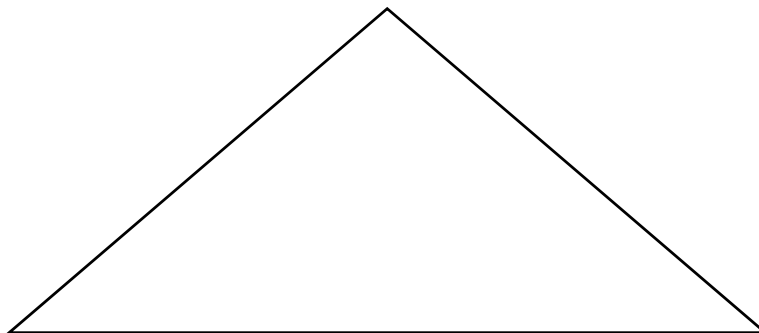
Complete the sentences below by writing a correct letter, *A*, *B*, or *C*, into each box.

Sentence 1: “The angles *D* and are **the same size**.”

Sentence 2: “The angles *D* and **add to 180°** .”

- (b)** **Construct the axis of symmetry** of the isosceles triangle below, by **bisecting** the correct angle **or** the correct side.

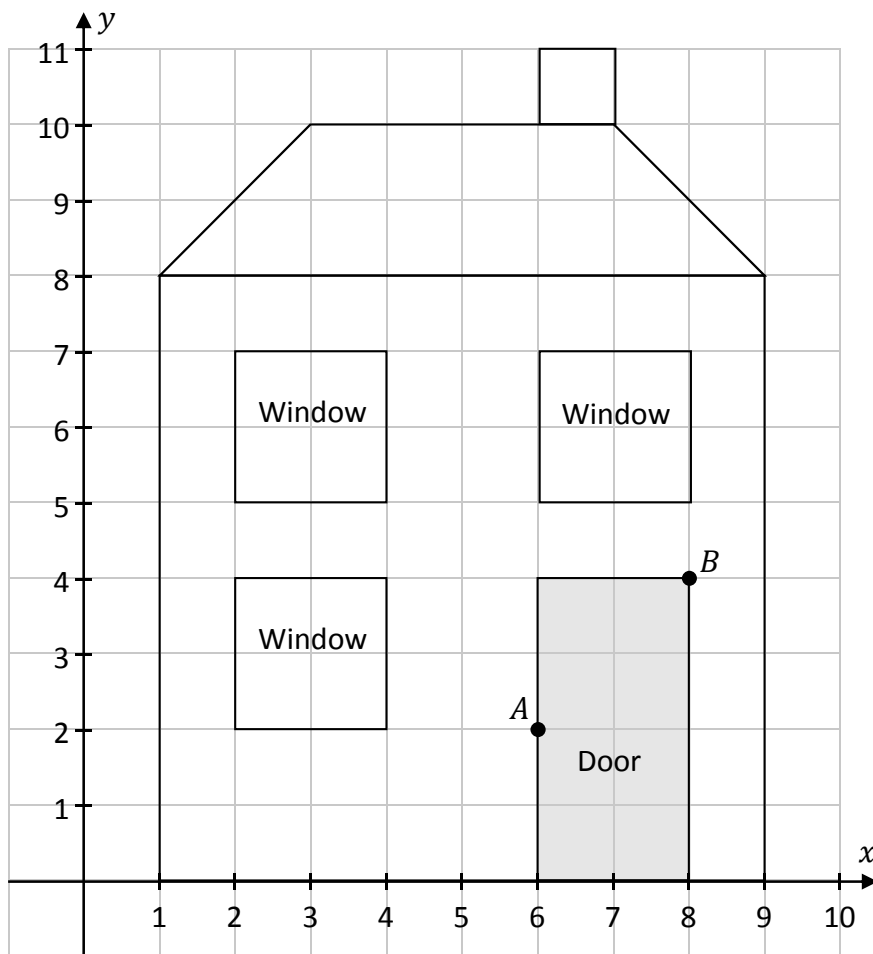
You may use only a compass and straight edge. Show all of your construction lines clearly.



Question 10**(Suggested maximum time: 15 minutes)**

The diagram shows a sketch of Joan's house on a co-ordinate grid.

Each small square on the grid has a side of length 1 cm. The points A and B are also shown.



- (a) There is a cracked tile on the roof at $D(4, 9)$.
Plot the point $D(4, 9)$ on the co-ordinate diagram. **Label** the point D .

- (b) Write down the co-ordinates of A and B .

$A =$

(		,		)
---	--	---	--	---

$B =$

(		,		)
---	--	---	--	---

- (c) There is a knocker half way between A and B .
Find the co-ordinates of the **midpoint** of $[AB]$.

Midpoint =

	,	
--	---	--



- (d) Write down the height and the width of the **door** in the sketch. Give each answer in cm.

Height =

--

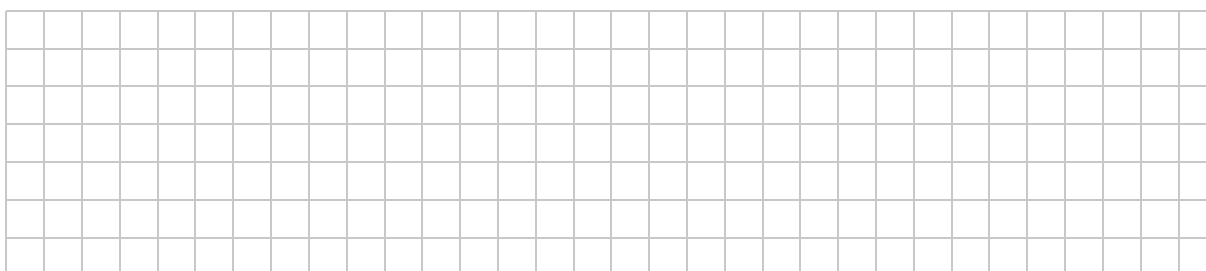
 cm

Width =

--

 cm

- (e) Work out the **area** of the door in the sketch, in cm^2 .



- (f) The sketch is to a scale of **1 cm = 0.5 m**.
Work out the actual height and actual width of the door, in metres.

Actual height =

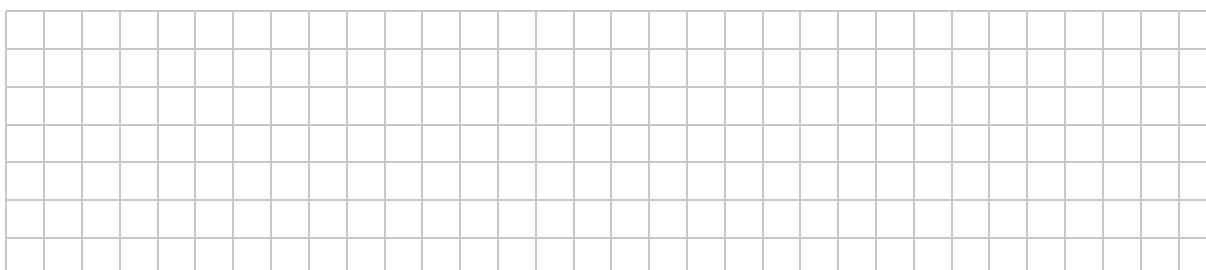
--

 m

Actual width =

--

 m



This question continues on the next page.

- (g)** Joan wants to paint the house, an area of roughly 170 m^2 .
Each tin of paint will cover 100 m^2 , and costs €42.50.
Joan can only buy full tins of paint – it is not possible to buy part of a tin.
Work out how much the paint will cost Joan.

[illegible]

Question 11

(Suggested maximum time: 5 minutes)

- (a)** Simplify:

$$t + 6c + 9t - 2c.$$

[illegible]

- (b)** Find the value of b where:

$$4b + 280 = 500.$$

[illegible]

Question 12 (Suggested maximum time: 5 minutes)

Question 12 (Suggested maximum time: 5 minutes)

A shop sells apples for a euro each and bananas for b euro each.

Complete the table below by writing in the missing description and the three missing expressions. Give each expression in terms of a and/or b .

Description	Expression (in €)
The cost of 3 apples	$3a$
The cost of 5 bananas	
The cost of 2 bananas and 6 apples	
	$a + 2b$
The change from €10 when you buy 3 apples	$10 - 3a$
The change from €20 when you buy 5 bananas	

[illegible]

(Suggested maximum time: 15 minutes)

(a) Fill in the table below, showing the amount of medicine left in the bottle at the end of each day for the first 5 days.

[illegible]

-
- A scatter plot showing the amount of medicine left (in ml) over 5 days. The y-axis is labeled 'Amount of medicine left (in ml)' and ranges from 0 to 160 in increments of 20. The x-axis is labeled 'Day' and ranges from 0 to 5. Two data points are plotted: (1, 140) and (2, 120).
- | Day | Amount of medicine left (in ml) |
|-----|---------------------------------|
| 1 | 140 |
| 2 | 120 |

- (c)** Work out how many days it will take Dominik to finish the bottle of medicine. Show your working out.

[illegible]

- (d) Dominik says: “The amount of medicine left in the bottle at the end of each day follows a **linear** pattern.”

Give a **reason** why Dominik is correct.

- (e) Put a tick (✓) in the correct box to show which expression represents this linear pattern, where d is the number of days. Tick **one** box only.

$$160 - 20d$$

☐

$$d^2 - 160$$

1

$d + 20$

9

[illegible]

Question 14**(Suggested maximum time: 15 minutes)**

- (a)** Put a tick (✓) in the correct box to show which type of triangle the Theorem of **Pythagoras** can **always** be applied to. Tick **one** box only.

equilateral

☐

scalene

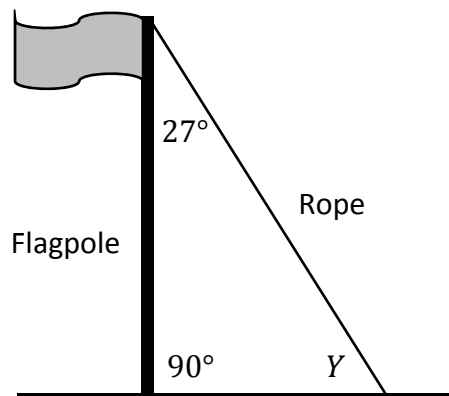
☐

right-angled

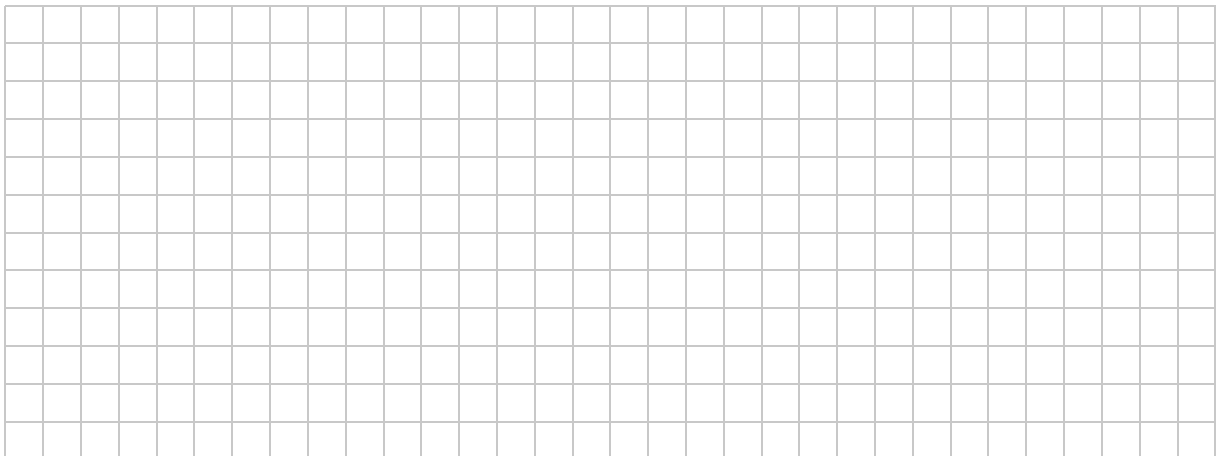
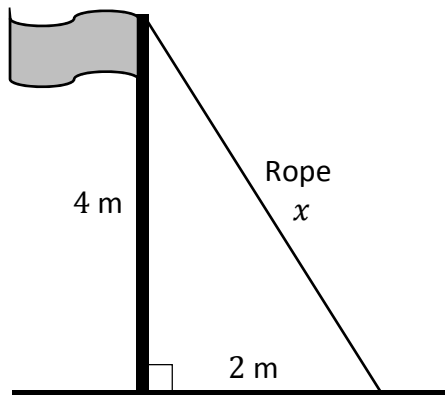
☐

Emma is going to use a rope to tie down a flagpole, as shown in the diagram below.

- (b)** The sizes of two angles are given in the diagram below.
Find the size of the angle Y , the third angle in this triangle.



- (c) The flagpole is 4 m high. The length of the rope is x .
 Emma will tie the rope 2 m from the base of the flagpole, as shown in the diagram below.
 Use the Theorem of **Pythagoras** to work out the value of x , the length of the rope.
 Give your answer in metres, correct to one decimal place.

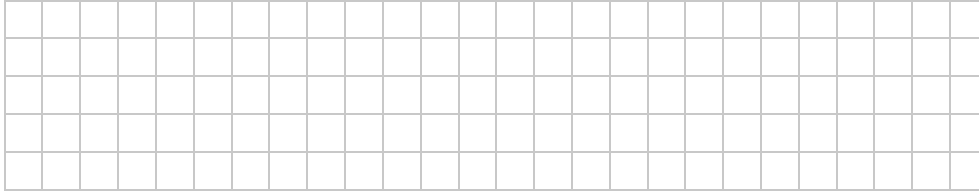


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(d) The flagpole has a height of 4 metres.

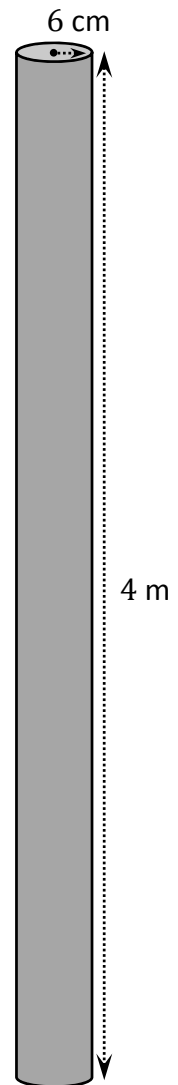
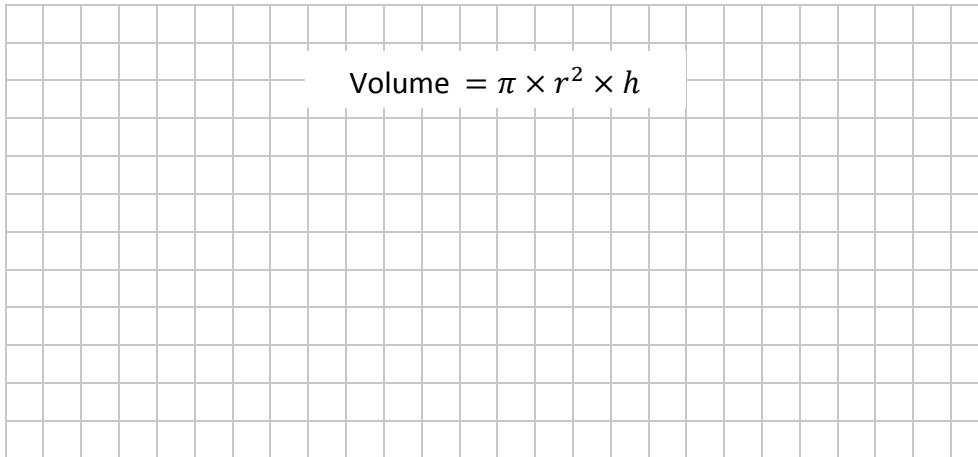
(i) Write this height in **centimetres**.

4 m = cm



(ii) The flagpole is in the shape of a cylinder.
It has a radius of 6 cm.

Work out the volume of the flagpole.
Give your answer in cm^3 , in terms of π .



Page for extra work.

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

Page for extra work.

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

This image shows a full page of blank graph paper. The grid consists of thin, light gray horizontal and vertical lines that intersect to form small squares across the entire surface. There are no margins, text, or other markings on the paper.

Junior Certificate 2018

Mathematics

Foundation Level

Friday 8 June

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