



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination 2017

Mathematics

Paper 1
Ordinary Level

Friday 9 June
Afternoon 2:00 – 4:00

300 marks

Examination Number		For Examiner						
		Q.	Ex.	Adv. Ex.	Q.	Ex.	Adv. Ex.	
		1			11			
		2			12			
		3						
		4						
		5						
		6						
		7						
		8						
		9						
		10			Total			
Centre Stamp								Grade
Running Total								

Instructions

There are 12 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:

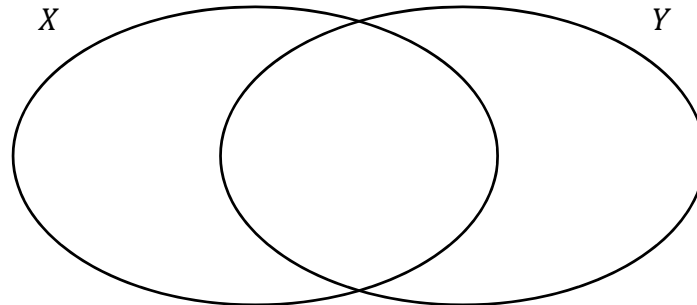
Question 2

(Suggested maximum time: 10 minutes)

(a) Fill in the Venn diagram below, given that:

$$X = \{ N, I, C, O, L, A \}$$

$$Y = \{ S, O, P, H, I, A \}.$$



(b) Write down a **subset** of X that has 2 elements, and that is also a subset of Y .

Answer =

{ , }

(c) Write down a **subset** of X that has 2 elements, and that is **not** a subset of Y .

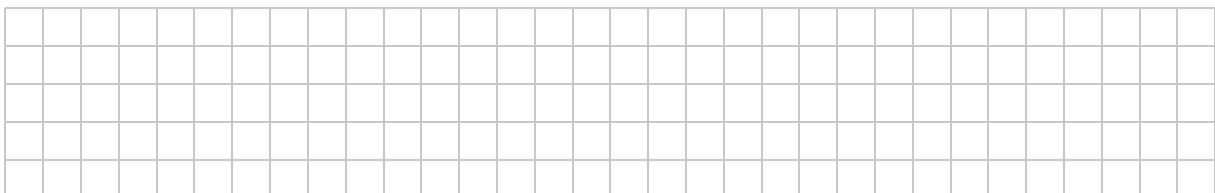
Answer =

{ , }

The table below shows three statements. Each statement is written in English and in set notation.

(d) Complete the table.

	English	Set Notation
Statement 1	Letters in both X and Y .	$X \cap Y$
Statement 2		$X \setminus Y$
Statement 3	Letters in X or Y or both .	



Question 4

(Suggested maximum time: 10 minutes)

In a raffle, there is a choice of three different prizes, **A**, **B**, or **C**.
The winner of the raffle chooses **one** prize.

(a) Prize **A**: The winner gets some money each day for six days.

She gets €10 on Day 1, €15 on Day 2, and so on until Day 6.

Each day after Day 1, she gets €5 **more** than she got the day before.

(i) Complete the table below to show how much money she gets each day for Prize **A**.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Prize A	€10	€15				

(ii) What kind of sequence is made by the daily amounts that the winner gets for Prize **A**?
Give a reason for your answer.

Kind of sequence:

(Tick (✓) **one** box only)

Linear

Quadratic

Exponential

Reason:

(iii) Find the **total** amount of money the winner will get if she chooses Prize **A**.

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

The function h takes a **shape** as an input. The output is the **number of sides** of that shape.

(a) Complete the table below, showing the number of sides of four different shapes.

Shape: x	Number of sides: $h(x)$
Pentagon	5
Square	
Hexagon	
	3

(b) Write down the **range** of the function h , as shown in the table above.

Range = { , , , }

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

(a) Find the value of $\frac{2n+1}{3n-2}$, when $n = 4$.

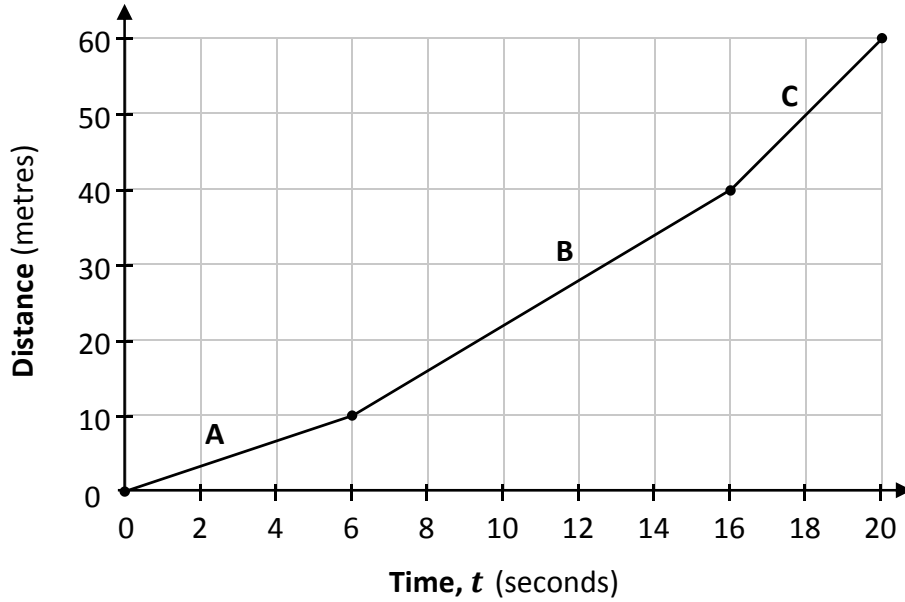
(b) Multiply out and simplify $(w + 4)(3w - 2)$.

Question 9

(Suggested maximum time: 15 minutes)

Martin took part in a 60 metre race.

The graph below shows the distance in metres travelled by Martin after t seconds during the race. The graph is in three sections, labelled **A**, **B**, and **C**.



(a) (i) How many seconds did it take Martin to finish the race?

Answer =

(ii) What distance had Martin travelled after 16 seconds?

Answer = m

(b) (i) Which was Martin's **slowest** section of the race?

Martin's slowest section:
 (Tick (✓) **one** box only)

A

B

C

(ii) Find Martin's **speed** during his slowest section of the race, in metres per second.

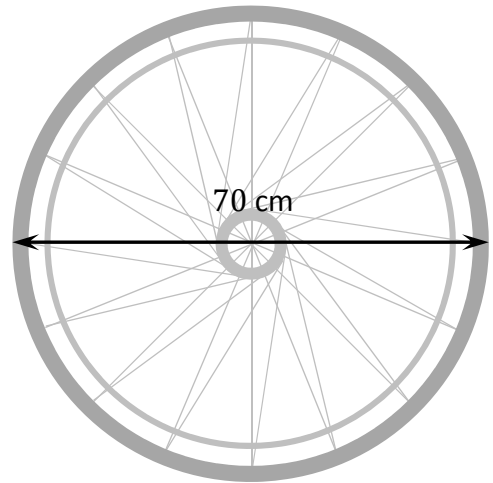
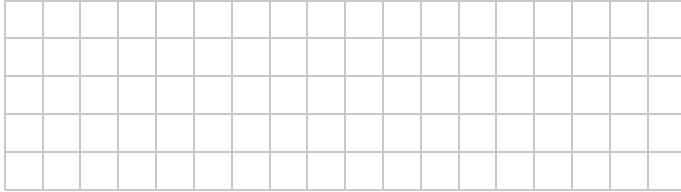
This question continues on the next page.

Martin was racing in a wheelchair.

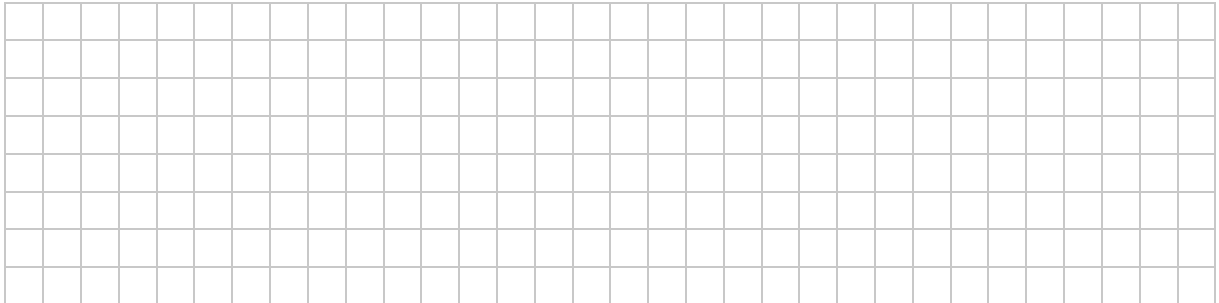
The **diameter** of the large circular wheel on Martin's wheelchair was 70 cm.

(c) (i) Write down the **radius** of this wheel.

Radius = cm

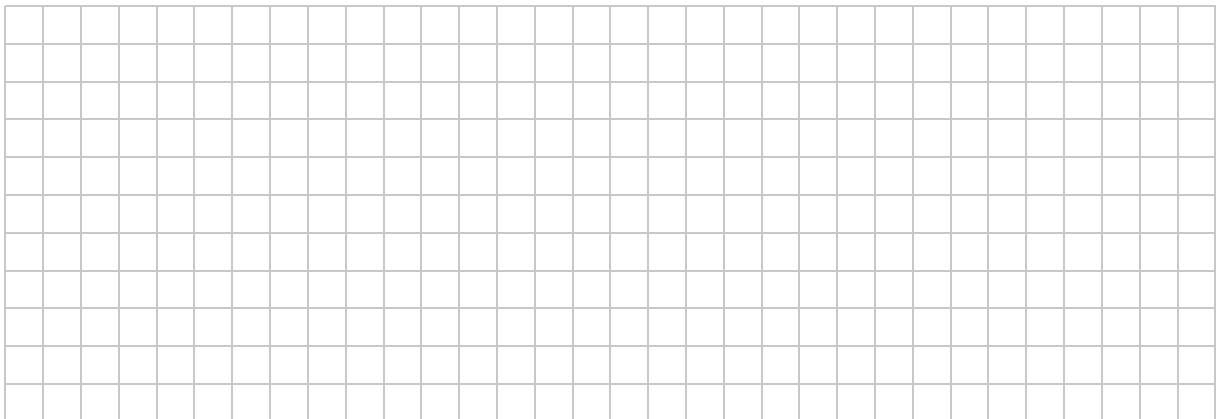


(ii) Show that the length of the **perimeter** of this wheel was 220 cm, correct to the nearest centimetre.



Every time this wheel turned fully, the wheelchair travelled a distance equal to the length of the wheel's perimeter.

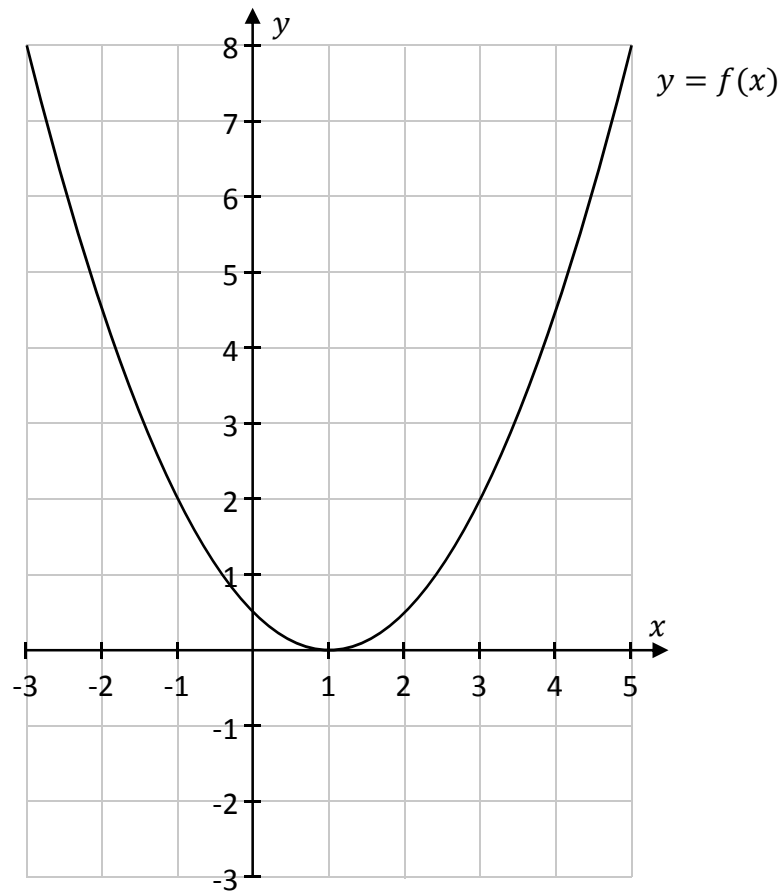
(d) Find how many times this wheel turned **fully** during the 60 metre race. Remember that there are 100 cm in one metre.



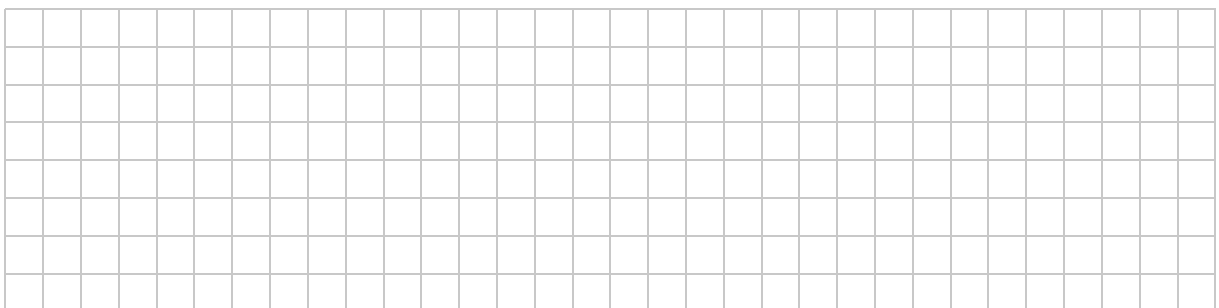
Question 12

(Suggested maximum time: 15 minutes)

(a) The co-ordinate diagram below shows the graph of the function $y = f(x)$.

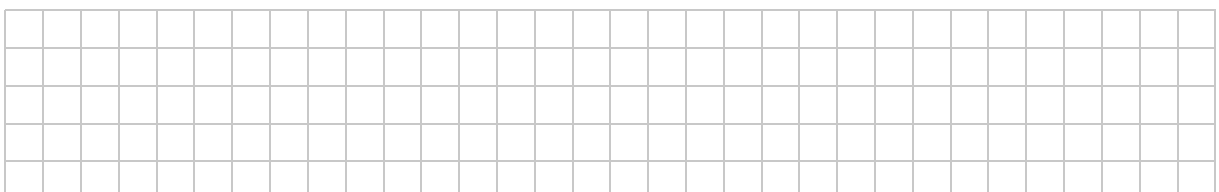


(i) On the same axes, draw the graph of the line $g(x) = x + 3$, for $-3 \leq x \leq 5$, $x \in \mathbb{R}$.



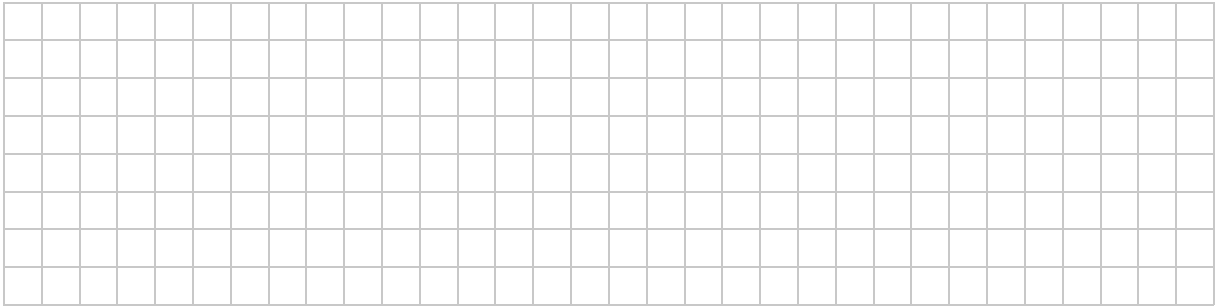
(ii) Use the graphs to write down the points of intersection of $f(x)$ and $g(x)$.

Answer = and

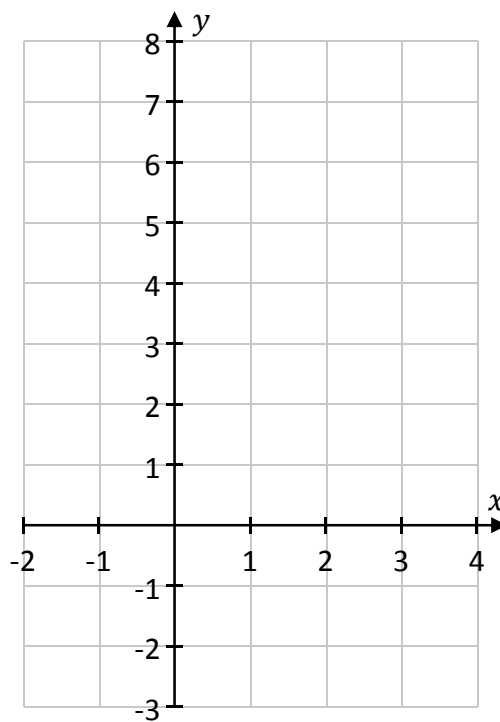


(b) Another function is $k(x) = x^2 - 2x - 1$.

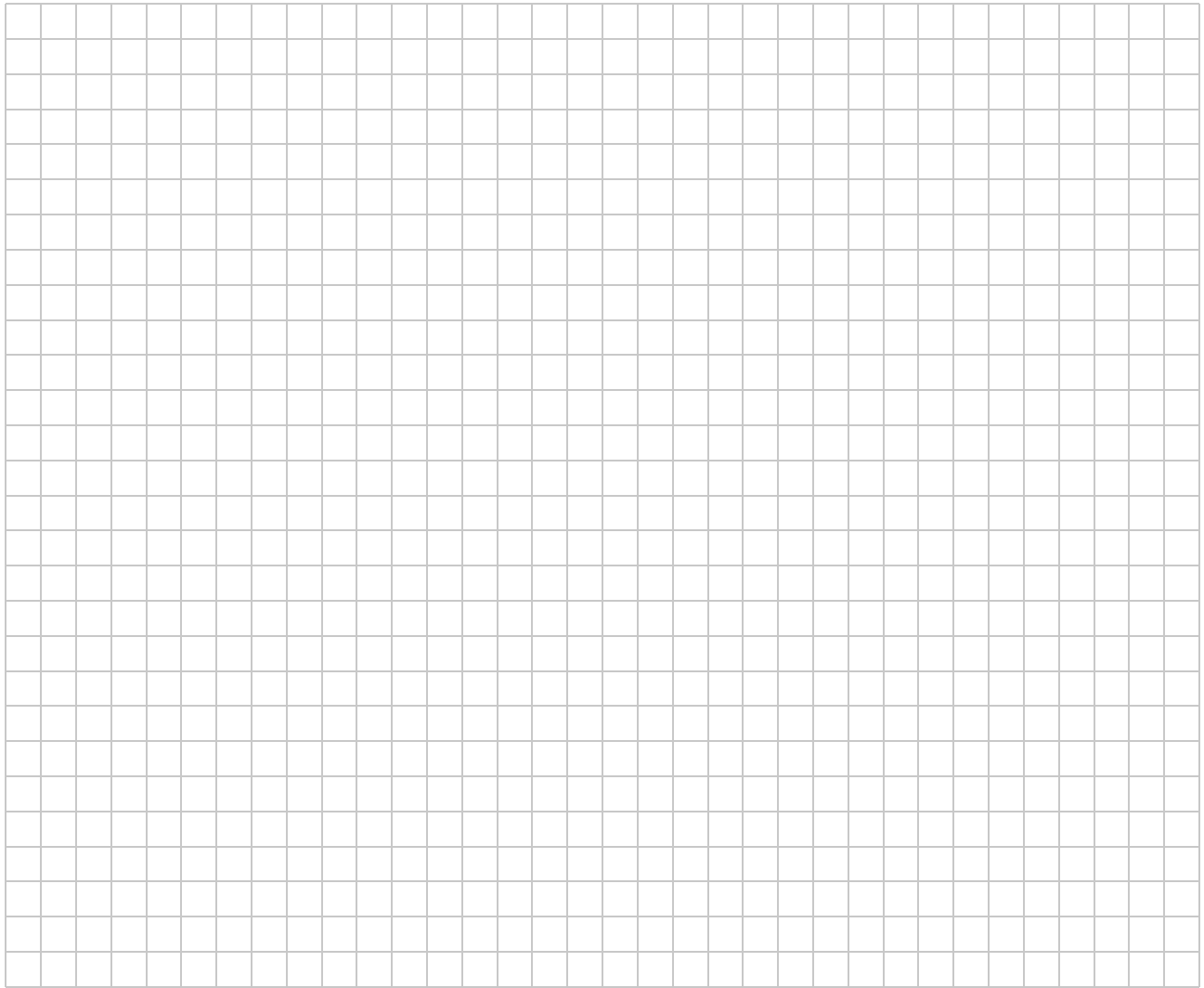
(i) Work out the value of $k(3)$.



(ii) Draw the graph of the function $k(x) = x^2 - 2x - 1$ on the axes below, for $-2 \leq x \leq 4$, $x \in \mathbb{R}$.



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