



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Applied 2024

Mathematical Applications

(200 marks)

Friday 7 June
Morning 9:30 to 11:30

General Directions

1. Write your EXAMINATION NUMBER in this space:
2. Write all answers in the spaces in this answerbook.
3. Show all supporting work in the space provided.
4. Include the appropriate units of measurement in your answer, where relevant.
5. Calculators may be used.
6. A copy of the *Formulae and Tables* booklet is available from the superintendent.
7. There are 6 questions on this examination paper. Answer **all** questions. Questions do not necessarily carry equal marks.

<i>For Superintendent</i>	
Centre Stamp	

<i>For Examiner</i>	
Running Total	
Credit	

<i>For Examiner</i>		
Q	Ex.	Adv. Ex.
1		
2		
3		
4		
5		
6		
Total		

Question 1

Sinéad and Bartos are organising the 6th year graduation dinner for students in their school. The year group is made up of **6 classes** which have **24 students** in each class.

- (a) Work out how many students are in 6th year in their school.

Sinéad is organising the transport to and from the graduation dinner.

156 people will be attending the meal, including some teachers.

She contacts a local bus hire company and finds the following information.

Vehicle	Seats	Price
	50	€550
	70	€750

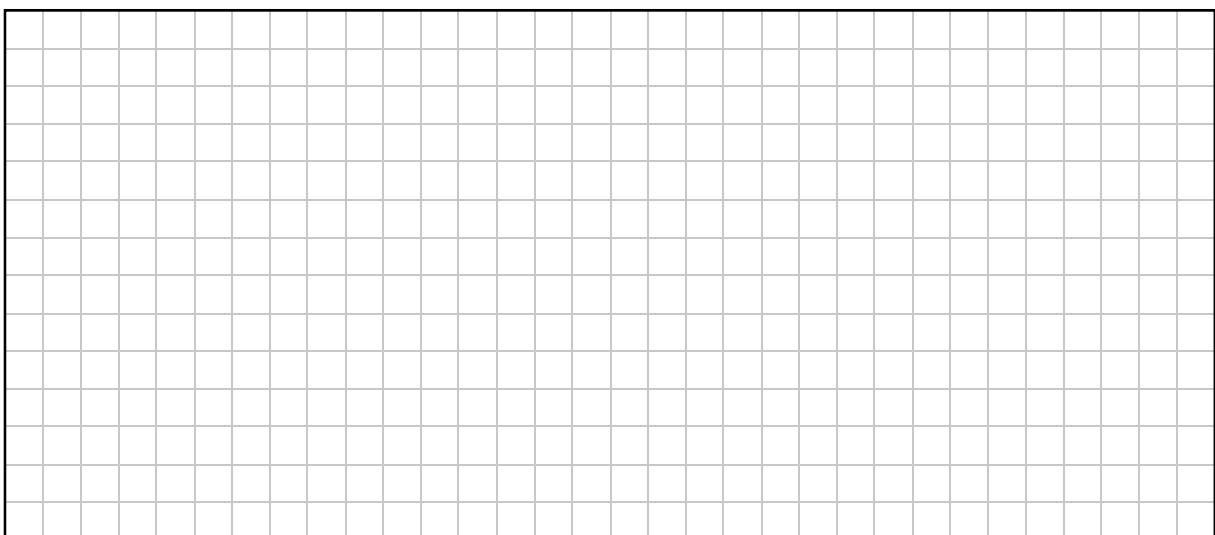
- (b) Work out the **minimum total cost** for the transport required to bring the group to their dinner.

Bartos contacts a restaurant who provide the following prices for the graduation dinner:

Ziad's Restaurant	
Date:	09/08/24
Quotation Reference:	0093
<ul style="list-style-type: none">• €80 for a private room• €24 per student• €18 per teacher	

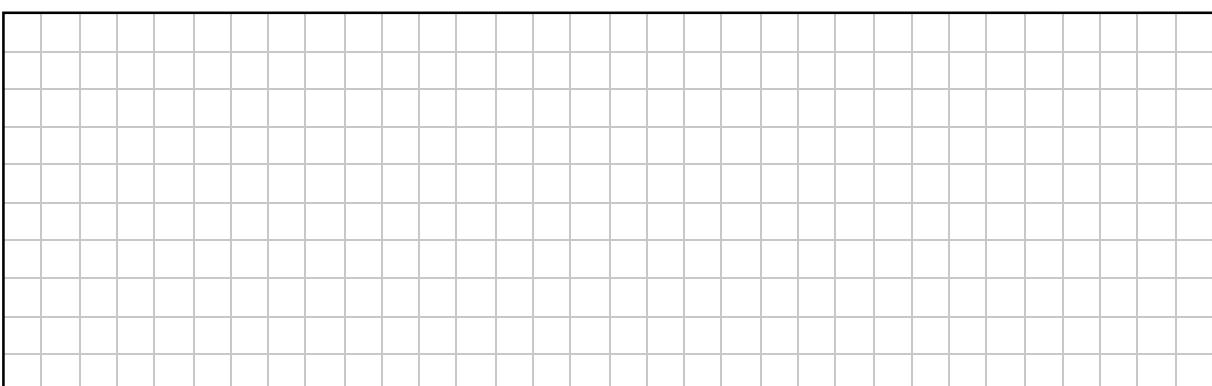
- (c) **144 students** and **12 teachers** are going to the dinner.

Work out the **total cost** of using this restaurant.



- (d) The total cost for the graduation dinner is €5878.
This cost is divided equally between the **144 students**.

Work out the cost for each student.
Give your answer correct to the nearest euro.



Question 2

John receives his first pay slip shown below.

Two of the deductions from his wages are included on the payslip.

Payslip			
Employee Name:	John Tobin	Date:	24 th February 2024
Earnings		Deductions	
Basic Pay:	€	PAYE:	€
Overtime:	€	PRSI:	€12.52
		USC:	€4.58
Gross Pay:	€	Total Deductions:	€
Net Pay (Gross Pay – Total Deductions):			€

Some important information about his pay is outlined in the boxes on the right of each of the following answer grids.

Use this information to complete the payslip.

- (a) (i) Work out John's **basic pay** for this week and write it in the correct space on the payslip.

- Each week, John works for **35 hours** at the basic rate of pay
 - His basic rate of pay is **€11.50 per hour**

- (ii) Work out John's **overtime pay** for this week and write it in the correct space on the payslip.

- His **overtime** rate is time and a half
 - He works **3 hours of overtime** this week

- (iii) Hence, work out John's **gross pay** for this week and write it in the correct space on the payslip.

- (iv) John's weekly **tax credits** are €68.20.

Use the formula below to help you work out his **PAYE charge** for this week and write it in the correct space on the payslip.

PAYE = Gross Tax – Tax Credits

- He pays income tax at a rate of **20%** on his **gross pay**

- (v) Hence, **work out** and fill in the amounts for **total deductions** and **net pay**.

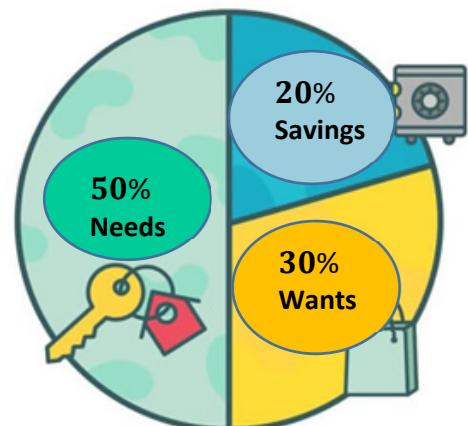
- (b)** The following week John splits his pay according to the information in the image on the right.

For example, he spends **50% of his net pay** on household **needs**.

That week John saves €93.

Work out John's net pay, according to this image.

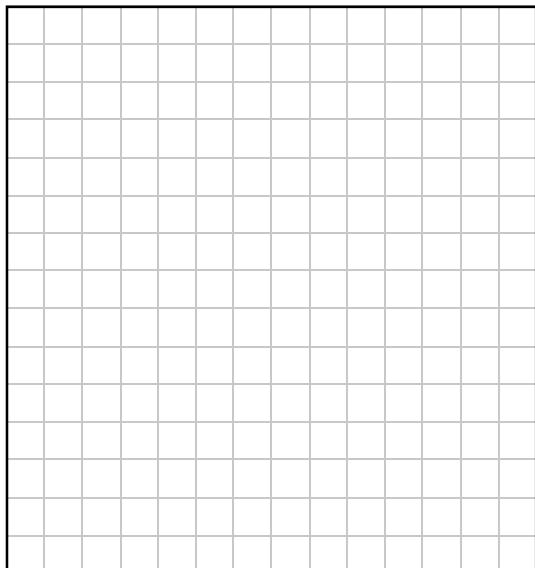
50/30/20



Question 3

Olwyn buys a fish tank in the shape of a rectangular solid.

- (a) (i)** Calculate the volume of the fish tank using the measurements on the image below. Give your answer in cm^3 .



- (ii) Hence, find the volume of the fish tank in litres ($1000 \text{ cm}^3 = 1 \text{ litre}$).

- (b)** Olwyn uses a hose to put water in the fish tank for the first time. The guidelines state that the volume of water in the tank should never exceed 150 litres.

Olwyn fills the fish tank to this maximum volume, using a hose.

The hose delivers **5 litres** of water **every minute**.

Work out how long it will take to fill the tank to this maximum volume.

Work out how long it will take to fill the tank to this maximum volume.

- (c) Olwyn finds some tablets to help keep the fish tank clean. Each week, she needs to use 1 tablet for every 50 litres of water. There are 40 tablets in the packet.

Work out **how many weeks** the packet of tablets will last.

- (d) The fish tank uses 4 units of electricity per day.

Use the table below to work out the cost of running the fish tank for **30 days**. Give your answer in euro, correct to the nearest cent.

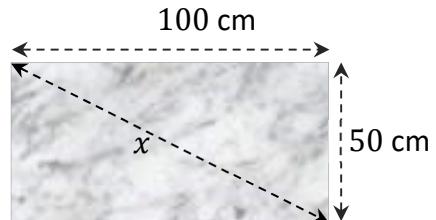
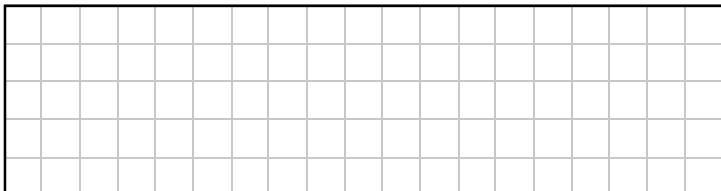
Units used per day	4
Units used per 30 days	
Cost per Unit of Electricity	23 c
Total Cost Before VAT	€
VAT @ 13.5%	€
Total Cost Including VAT	€

Question 4

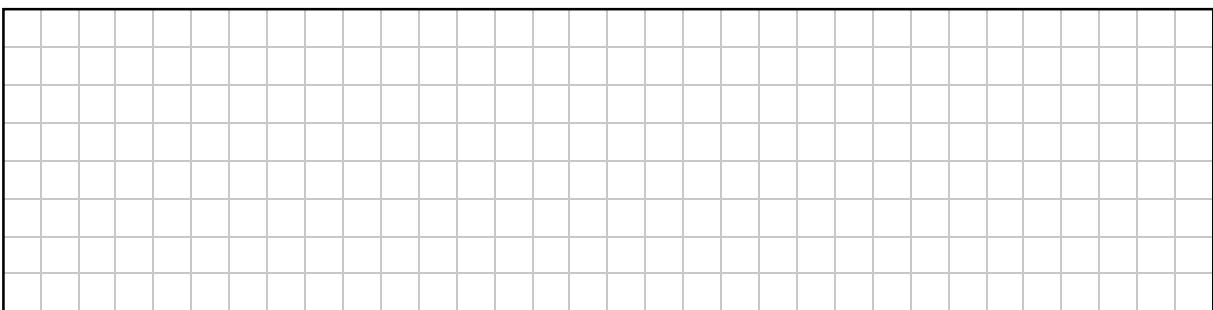
Green Landscapes has been hired to lay a patio in a back garden. They import patio tiles from LuxTiles in Italy.

- (a) Each rectangular tile measures $50 \text{ cm} \times 100 \text{ cm}$.

- (i) Work out the **area** of one tile.
Give your answer in m^2 .

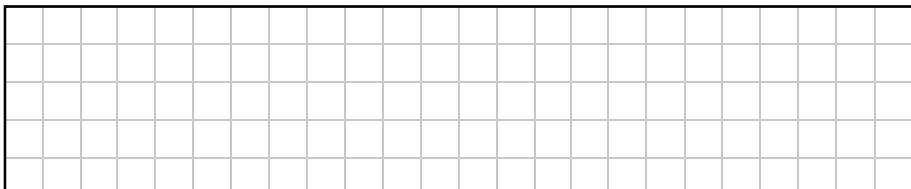


- (ii) To complete the patio Green Landscapes need to cut some tiles in half along the diagonal of the tile. Use **Pythagoras' theorem** to work out the **length of the diagonal**, marked x on the image above.
Give your answer in cm, correct to the nearest cm.

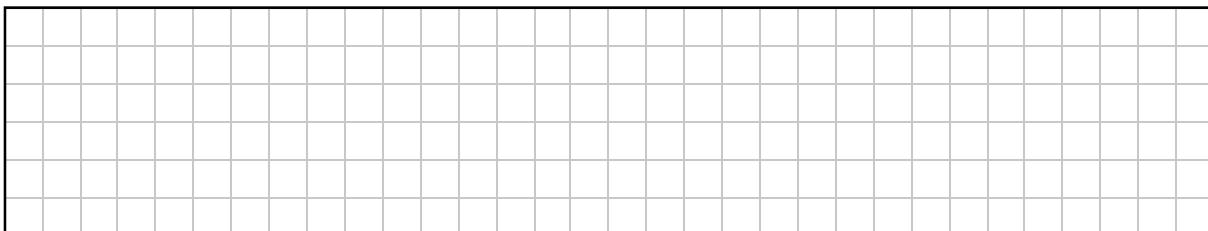


- (b) For a different job they use tiles with an area of 0.16 m^2 .
Each box of these tiles can cover 3.2 m^2 .

- (i) Work out **how many tiles** there are in each box.



- (ii) Green Landscapes need to cover an area of 16 m^2 with these tiles.
Allowing for 15% breakages, how many boxes will they need to order?

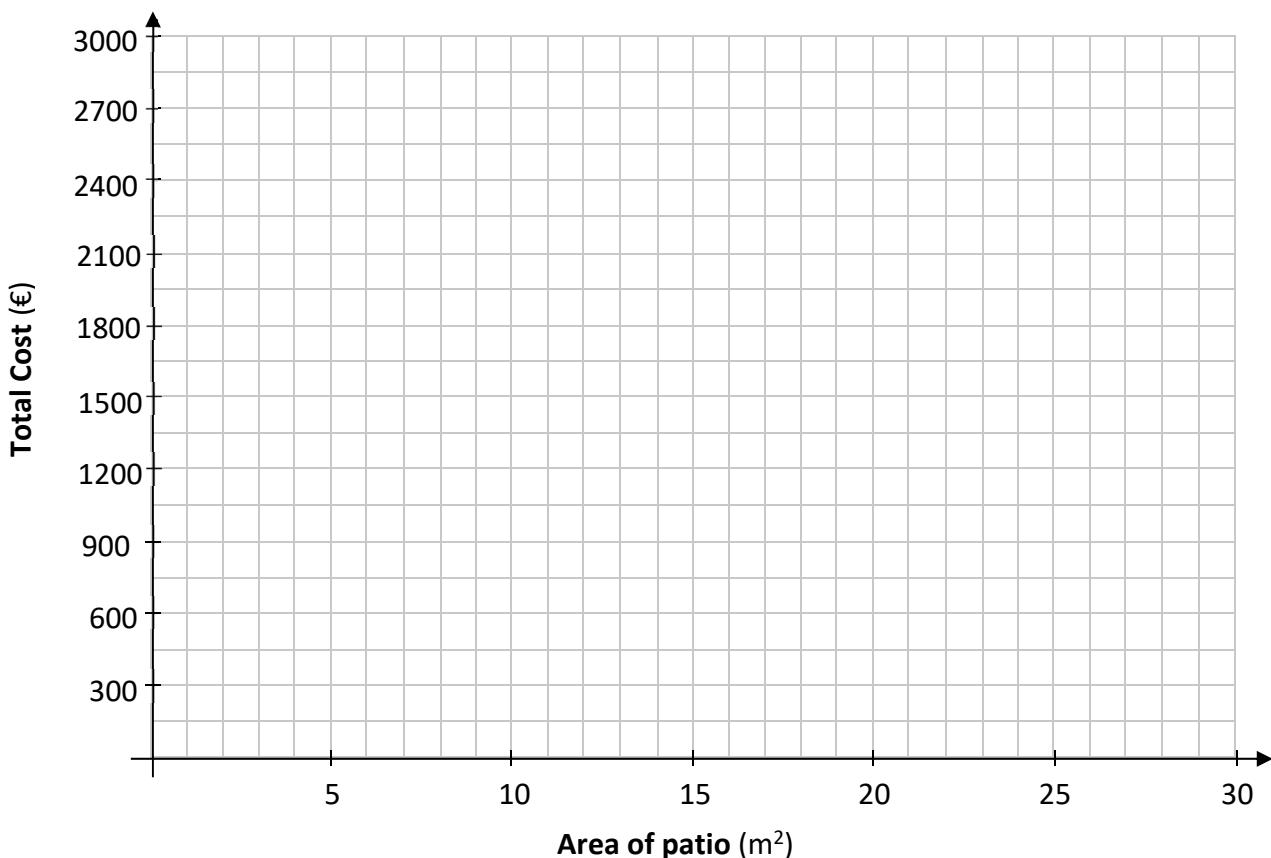


- (c) For another project the cost will depend on the area of the patio.
There will be a fixed standing charge and then the cost will **increase by €90 per m²**.

- (i) Complete the table below to show the **total cost** of laying the patio per m².

Area of patio (m ²)	0	5	10	15	20	25	30
Total cost (€)	150		1050			2400	
Cost per m ² (€)	30	31	32	33	34	35	36
Labour cost (€)	50	50	50	50	50	50	50

- (ii) Draw a **straight-line graph** to illustrate the information in the table above.



- (iii) Use your graph to estimate the cost of laying a patio with an area of 12 m^2 .

Question 5

Mai is ordering hoodies for her Leaving Certificate Applied class.

She finds a company in Northern Ireland who supply personalised hoodies.

A plain hoody costs £25 and students can have their name printed on the back at an extra charge of £0.50 per letter.

- (a) Complete the table below to show the cost of a hoody for each of the students listed.

Name	Number of letters	Extra cost for printing letters	Cost of a plain hoody	Total cost for the hoody
John	4	£2		£27
Olwyn	5	£2.50		
Adriana			£25	£28.50
Sinéad		£3	£25	

In order to simplify the process, the students agreed to pay the same amount regardless of the number of letters in their name.

Twenty-one students placed an order and the total cost of all the hoodies was £577.50.



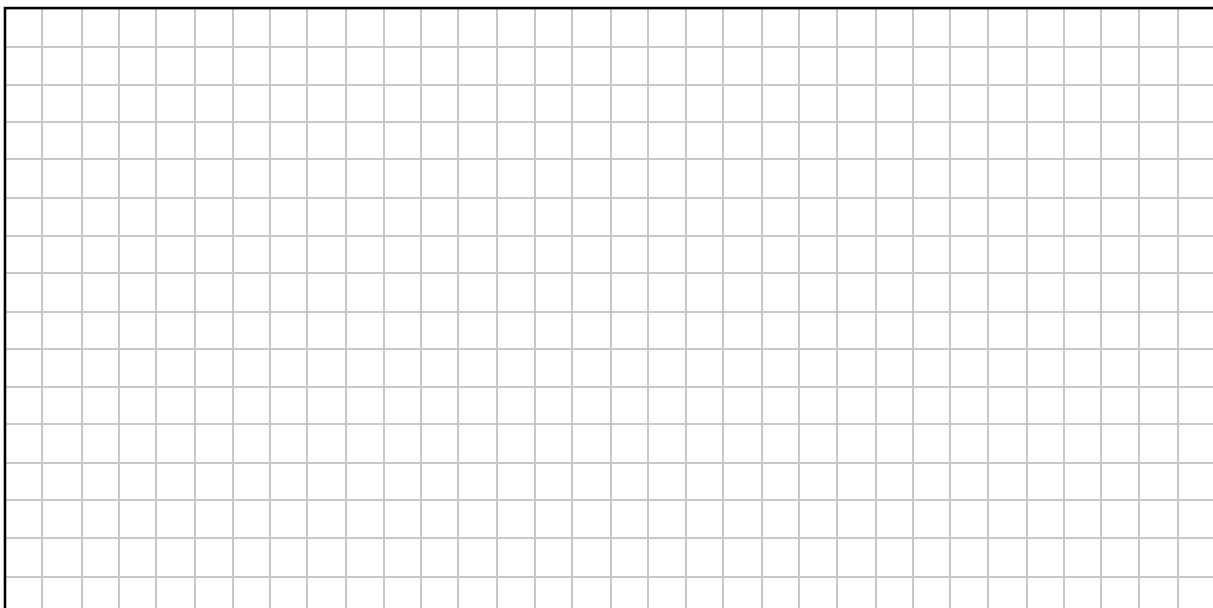
- (b) Work out the price, in sterling, each student should pay for a hoody **and** find the average number of letters per name.

Price per student:	
Average number of letters:	

Mai found a **euro to sterling** conversion rate online and decided to charge each student €34. When the invoice arrived, Mai discovered that the company who supplied the hoodies used a different rate, as outlined below.

$$\text{£1} = \text{€1.20}$$

- (c) Show that Mai had collected enough money to cover the payment.
(Remember: The cost of the hoodies was £577.50 and twenty-one students paid €34 each.)

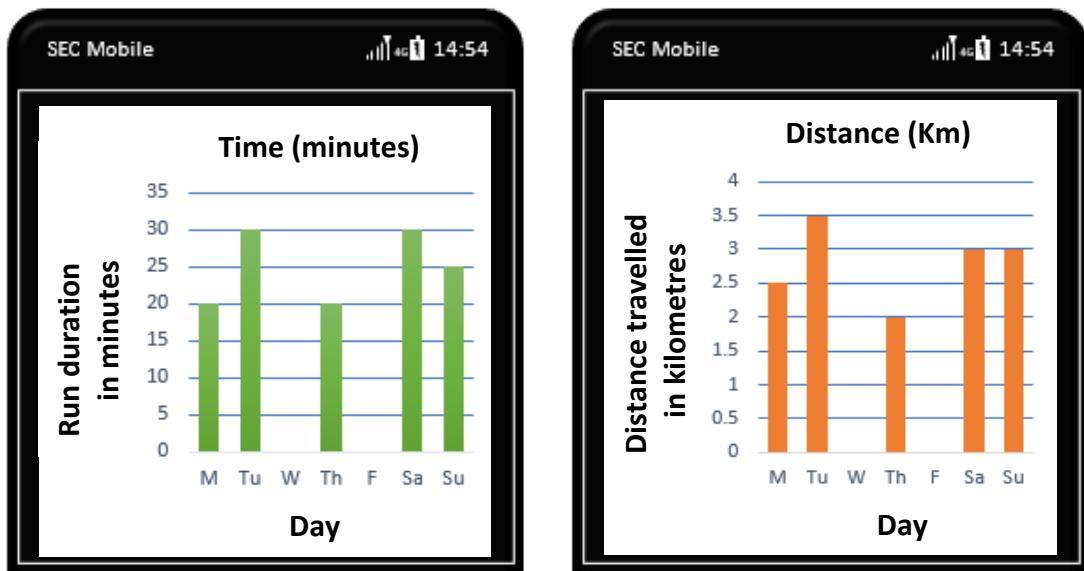


Question 6

John uses an app on his smart phone to collect data on daily runs.

The images below show this information over the course of a week (7 days).

Use the images below to answer part (a)(i) and part (a)(ii).



- (a) (i) How many minutes did John spend running on **Tuesday (Tu)**?

- (ii) What **distance** did John run on **Tuesday**?

- (iii) Using your answers to part (a)(i) and part (a)(ii) above, or otherwise, work out John's **average speed** during his run on **Tuesday**.

Give your answer in **km/hour**.

- (b)** John says: I ran 3 kilometres per day on both Saturday and Sunday.
Use the information in the images to say whether he ran faster on Saturday or Sunday.
Give a reason for your answer.

Answer:	
Reason:	

- (c) (i) Work out the **total distance** run by John over the **7 days**.

- (ii) Work out the **mean distance** run by John over the **7 days**.

- (iii) Work out the **median distance** run by John over the **7 days**.

This question continues on the next page.

John keeps a diary of his runs every week.

Three diary entries are shown below on the left hand side of this page.

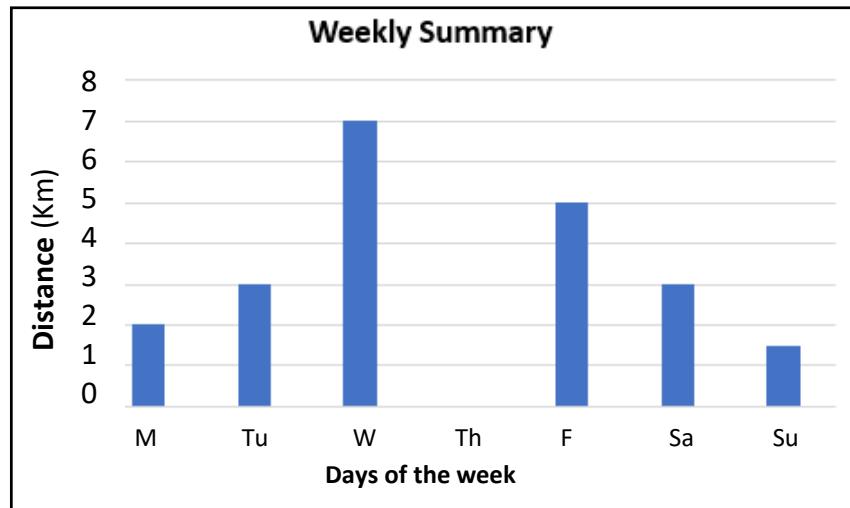
Three graphs, generated by a fitness app, are shown to the right of each diary entry.

Note that the scales are **not the same** on each graph.

(d) Draw an arrow from each diary entry to match it with the corresponding graph.

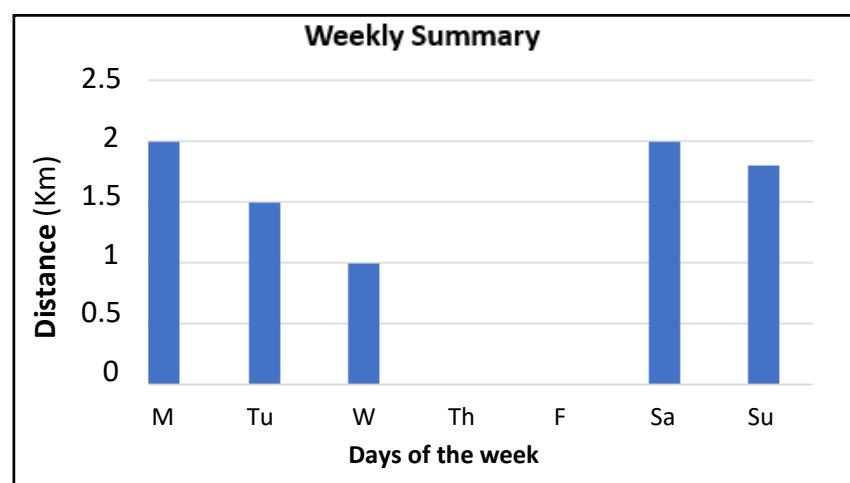
Dear Diary,

This week was a tough week. My longest run was only 2 km. I took two rest days. I will get back on track next week.



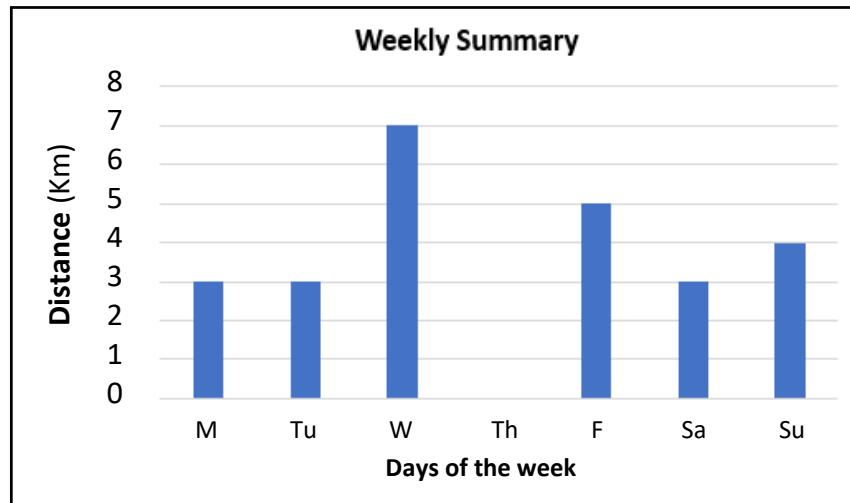
Dear Diary,

I got on great this week. I ran 5 km in 24 minutes on Friday. This is a new personal best. All my hard work is paying off.



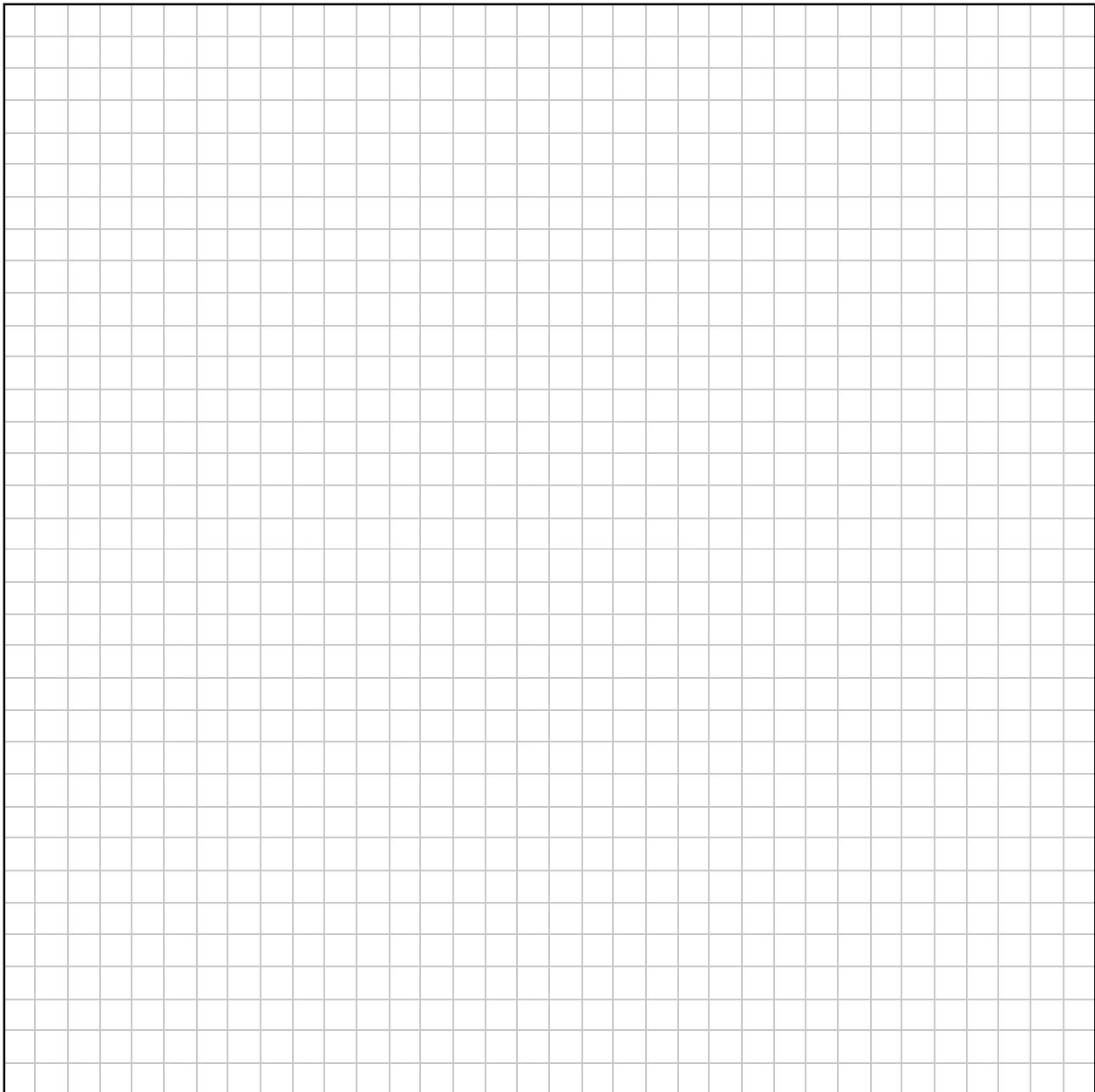
Dear Diary,

This week went well. My longest run was 7 km. I took one rest day, but I should have taken two because I could only manage 1.5 km on Sunday.



Page for extra work.

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



Acknowledgments

- Image on page 2: www.roscommoncoaches.ie. Altered.
- Image on page 2: www.oharascoaches.com. Altered.
- Image on page 5: www.debtnegotiators.com.au. Altered.
- Image on page 6: www.amazon.ie. Altered.
- Image on page 10: www.etsy.com. Altered.

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Leaving Certificate Applied – Common Level

Mathematical Applications

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