Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2012

Mathematics

Unit T2
(With calculator)
Foundation Tier

[GMT21]

GMT21

WEDNESDAY 6 JUNE 9.15 am–10.45 am

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Complete in blue or black ink only. **Do not write in pencil or with a gel pen.**
Answer **all twenty-two** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Functional Elements will be assessed in this paper.
Quality of written communication will be assessed in **questions 1, 4 and 10**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is overleaf.

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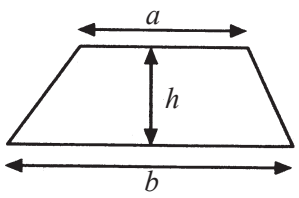
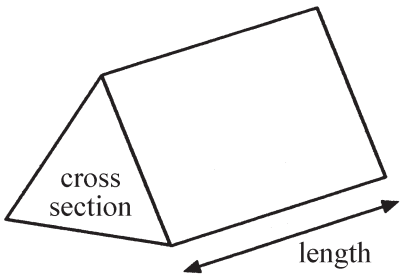
Formula Sheet

Area of trapezium $= \frac{1}{2}(a+b)h$



Volume of prism = area of cross section × length



Quality of written communication will be assessed in this question.

Examiner Only	
Marks	Remark

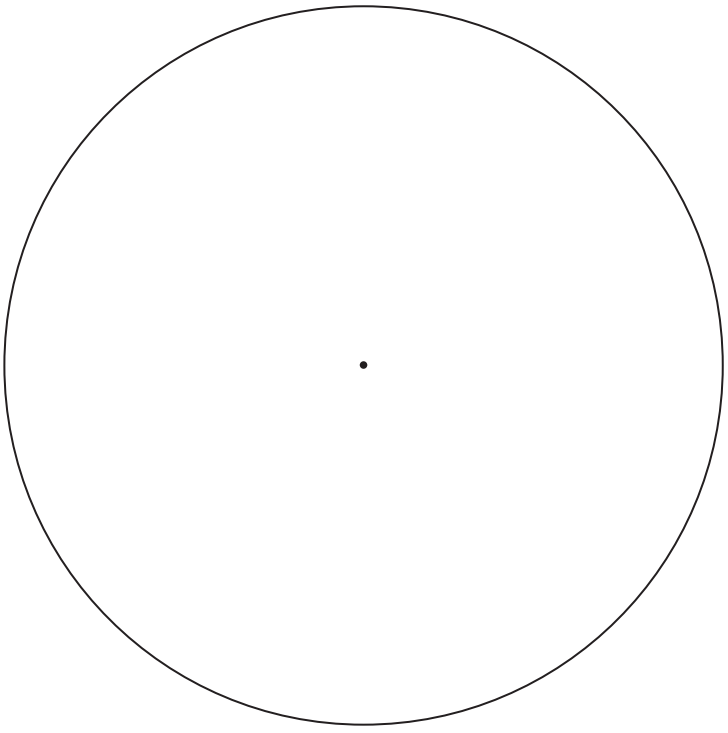
1 **(a)** Show how to work out $\frac{7}{12} - \frac{1}{2}$ if you do not have a calculator.

[2]

(b) The following table gives the numbers of the pets owned by a group of primary school children.

Pet	Dog	Cat	Rabbit	Guinea Pig
Number of children	55	35	20	10
Angle				

Draw a pie chart to illustrate this data.



[4]

Total Question 1

[Turn over

Examiner Only	
Marks	Remark

2 **(a)** Draw accurately and label a triangle ABC with AB = 7 cm, angle A = 60° and angle B = 70°. Start with the line AB below.

A _____ B [2]

(b) Calculate the size of angle x in the kite below.

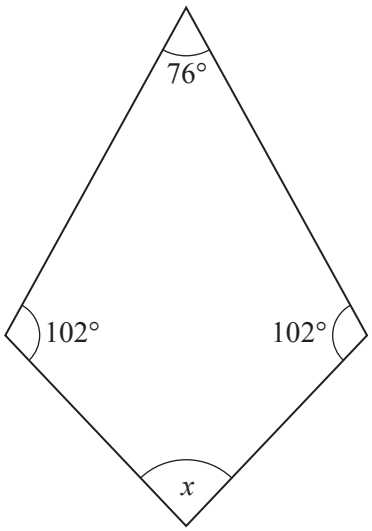


Diagram not drawn accurately

Answer x = _____ ° [2]

Total Question 2

3 Write in the missing numbers

(a) $\sqrt{2.25}$ + $\square$ = 4 [1]

(b) $\square$ − 3^3 = 11 [1]

(c) $\dfrac{3}{0.5^2}$ = $\square$ [1]

Examiner Only	
Marks	Remark
Total Question 3	

[Turn over

Quality of written communication will be assessed in this question.

Examiner Only	
Marks	Remark

4 Bill bought 36 memory sticks at £4.20 each.

He sold 28 of them for £4.50 each and the other 8 for £3 each.

Did he make a profit or loss, and by how much?

Show your working.

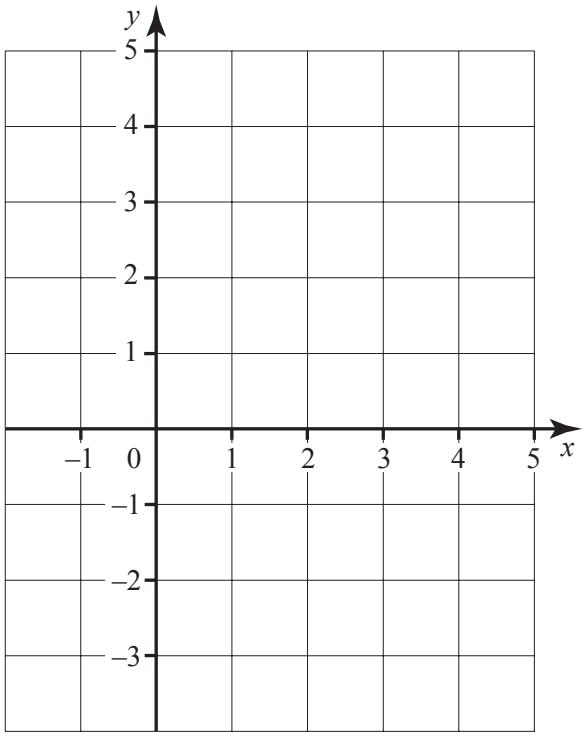
Answer _____ by £ _____ [4]

Total Question 4	

5 Complete the table below and hence draw the graph of $y = 2x - 3$

x	0	1	2	3	4
y	-3		1		5

[1]



[2]

Examiner Only	
Marks	Remark
Total Question 5	

6 Ages of 24 people taking a car driving test

1	5	7	7	8	8	8	9			
2	0	0	0	0	1	2	3	5	7	7
3	2	2	4	6	6					
4	1	2								

Key: 3 | 2 = 32 years

(a) One age has been recorded inaccurately. Put an **X** through the inaccurate age and give a reason for your answer.

Reason _____ [1]

(b) The test centre manager says, "The range of ages of those who sat the test was 28". Use this information to make the stem and leaf diagram correct. [1]

(c) The data from the stem and leaf diagram is to be represented on a pie chart. Calculate the angle on the pie chart which would represent the modal age.

Answer _____ ° [2]

Examiner Only	
Marks	Remark
Total Question 6	

7 **(a)** Solve the equations:

(i) $3x + 11 = 17$

Answer $x =$ _____ [2]

(ii) $3(2x - 5) = 4$

Answer $x =$ _____ [3]

(b) Write down the next two numbers in the sequence

12, 11, 9, 6, _____ , _____ [2]

(c) Simplify $3b - 2g + 4b + 7g$

Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 7	

[Turn over

8 An exchange bureau charges £3.50 for every transaction.

The number of euro you get from changing a certain number of pounds can be calculated using the formula:

number of euro = exchange rate × (number of pounds − 3.5)

(a) Calculate the number of euro you get for £150 when the exchange rate is 1.2

Answer _____ euro [3]

(b) Explain how the formula would change if the bureau increased the charge to £3.80 for every transaction.

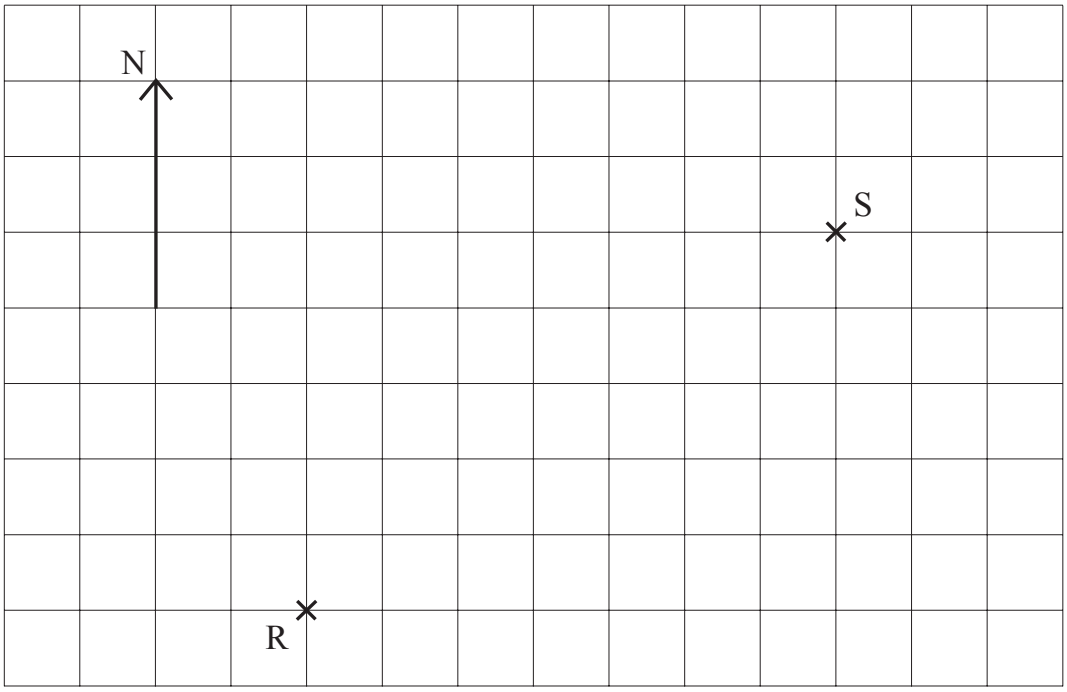
[1]

(c) One week the bureau discovered that 15% of the £20 notes they changed were fake. If they changed £5,600 worth of £20 notes, how many of these £20 notes were fake?

Answer _____ [3]

Examiner Only	
Marks	Remark
Total Question 8	

9 Two lighthouses are at the points R and S on the diagram.



(a) What is the bearing of S from R?

Answer _____° [1]

(b) What is the bearing of R from S?

Answer _____° [1]

(c) The scale of the drawing is 1 cm to 4 km.

What is the actual distance between the two lighthouses?

Answer _____ km [3]

Examiner Only	
Marks	Remark
Total Question 9	

[Turn over

Quality of written communication will be assessed in this question.

Examiner Only	
Marks	Remark

10 Jacob wants to investigate the hypothesis

"Children watch more television than adults."

He surveys 8 boys in his class and 8 teachers in his school.

Give **two** reasons why his sample is unsuitable.

Reason 1 _____

_____ [1]

Reason 2 _____

_____ [1]

Total Question 10	

11 Liz buys x markers at 90p each and 3 books at £1.20 each. The total cost is £13.50

Write down an equation and solve it to find x.

Equation _____

Answer x = _____ [4]

Examiner Only	
Marks	Remark
Total Question 11	

[Turn over

12 **(a)** Write the ratio 12 : 27 in its simplest form.

Answer _____ [1]

(b) The heights of three flower pots are 45 cm, 30 cm and 10 cm.

Write the ratio of their heights in simplest form.

Answer _____ [1]

(c) Complete the following:

(i) $0.\dot{6}$ can be written as the fraction _____ [1]

(ii) The recurring decimal 0.280280280… can be written using dot notation as _____ [1]

(d) Fill in the box to make the statement correct.

$$\frac{1}{\square} + \frac{1}{4} = \frac{9}{20}$$ [2]

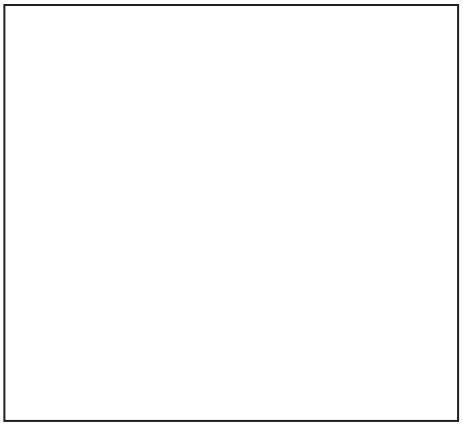
Examiner Only	
Marks	Remark
Total Question 12	

13 **(a)** Calculate the circumference of a circular garden with radius 5.4 m.

Examiner Only	
Marks	Remark

Answer _____ m [2]

(b) The area of the rectangle below is 33 cm^2.



Change 33 cm^2 into mm^2.

Answer _____ mm^2 [2]

[Turn over

(c) Find the area of a triangle with base 9 cm and perpendicular height 6 cm.

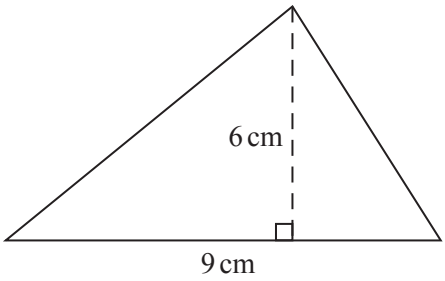


Diagram not drawn accurately

Answer _____ [3]

Examiner Only	
Marks	Remark
Total Question 13	

14 **(a)** Complete the following to write 252 as a product of prime factors.

$252 = 2 \times 2 \times 3 \times \_\_\_\_\_ \times \_\_\_\_\_$ [1]

(b) Write 297 as a product of prime factors.

Answer _____ [1]

(c) A floor measuring 252 cm by 297 cm is to be covered **completely** by identical square tiles.
What is the **length** of side of the largest square tile that can be used?

Answer _____ cm [2]

Examiner Only	
Marks	Remark
Total Question 14	

[Turn over

15 **(a)** Paul's car insurance is due and the company quote him a price of £228. Another company make him an offer which is 35% cheaper and he decides to take up their offer. How much does he pay?

Answer £ _____ [2]

(b) Last year Paul's house insurance cost £250.
This year the cost is £268. What is the percentage increase?

Answer _____ % [3]

Examiner Only	
Marks	Remark
Total Question 15	

16 Write down the nth term of the following sequences:

Examiner Only	
Marks	Remark

(a) 6, 12, 18, 24, ...

Answer _____ [1]

(b) 3, 8, 13, 18, ...

Answer _____ [2]

Total Question 16

[Turn over

17 Two sides of a triangle are 6 cm and 8 cm.

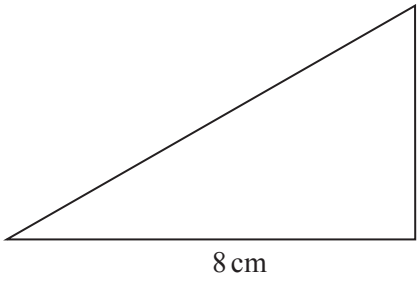


Diagram not drawn accurately

(a) **If** the third side is 10 cm, show why the triangle **must** be right-angled.

[1]

(b) If the triangle is **not** right-angled write down a possible length that the third side could have.

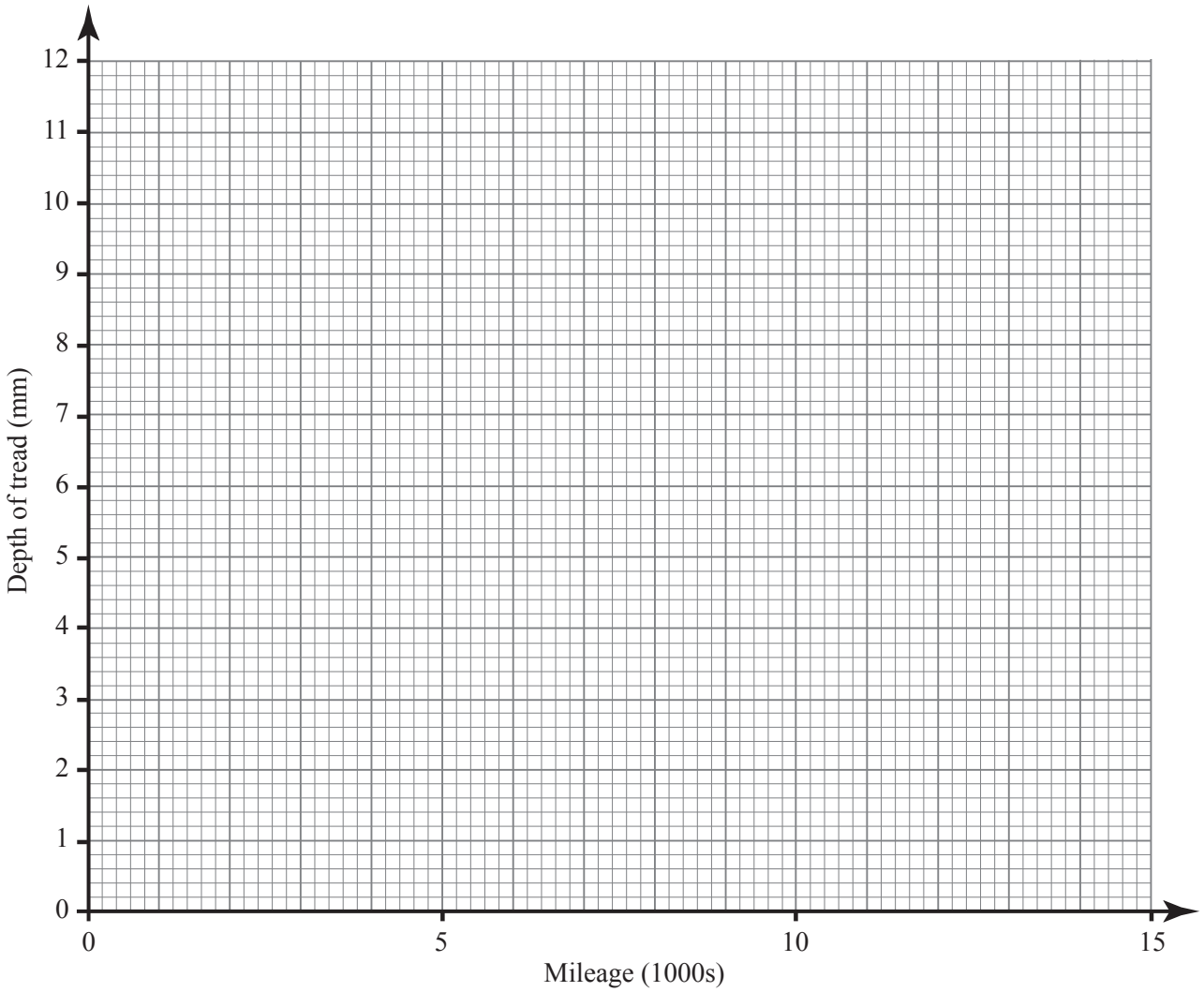
Answer _____ cm [1]

Examiner Only	
Marks	Remark
Total Question 17	

18 The mileage on seven cars (in 1000s of miles) and the depth of tread on the tyres (in mm) were recorded. The table shows the results.

Mileage (1000s)	3	8	12.5	9	6	15	4.5
Depth of tread (mm)	9.4	7.7	10.6	7.4	8.4	4.9	8.7

(a) Draw a scatter graph for this data.



[2]

Examiner Only	
Marks	Remark

[Turn over

(b) One of the points seems unusual. Circle this point and suggest a possible reason for it.

Answer _____

_____ [1]

(c) Describe the type of correlation of the other points and explain what this means.

Answer _____

_____ [2]

Examiner Only	
Marks	Remark
Total Question 18	

19 **(a)** P is the point (1, 4). Q is the point (7, −2). Find the co-ordinates of the midpoint of PQ.

Answer (_____ , _____) [2]

(b) Calculate the size of the interior angle of a regular nonagon (nine-sided polygon).

Answer _____ ° [2]

(c) Calculate the area of a semi-circle with diameter 6 cm.

Answer _____ cm^2 [2]

Examiner Only	
Marks	Remark
Total Question 19	

20 The table shows the ages of people visiting the town library one Saturday morning.

Age	Frequency
$0 < A \leqslant 10$	7
$10 < A \leqslant 20$	4
$20 < A \leqslant 30$	5
$30 < A \leqslant 40$	4
$40 < A \leqslant 50$	18
$50 < A \leqslant 60$	20
$60 < A \leqslant 70$	22

(a) Write down the class interval which contains the median age.

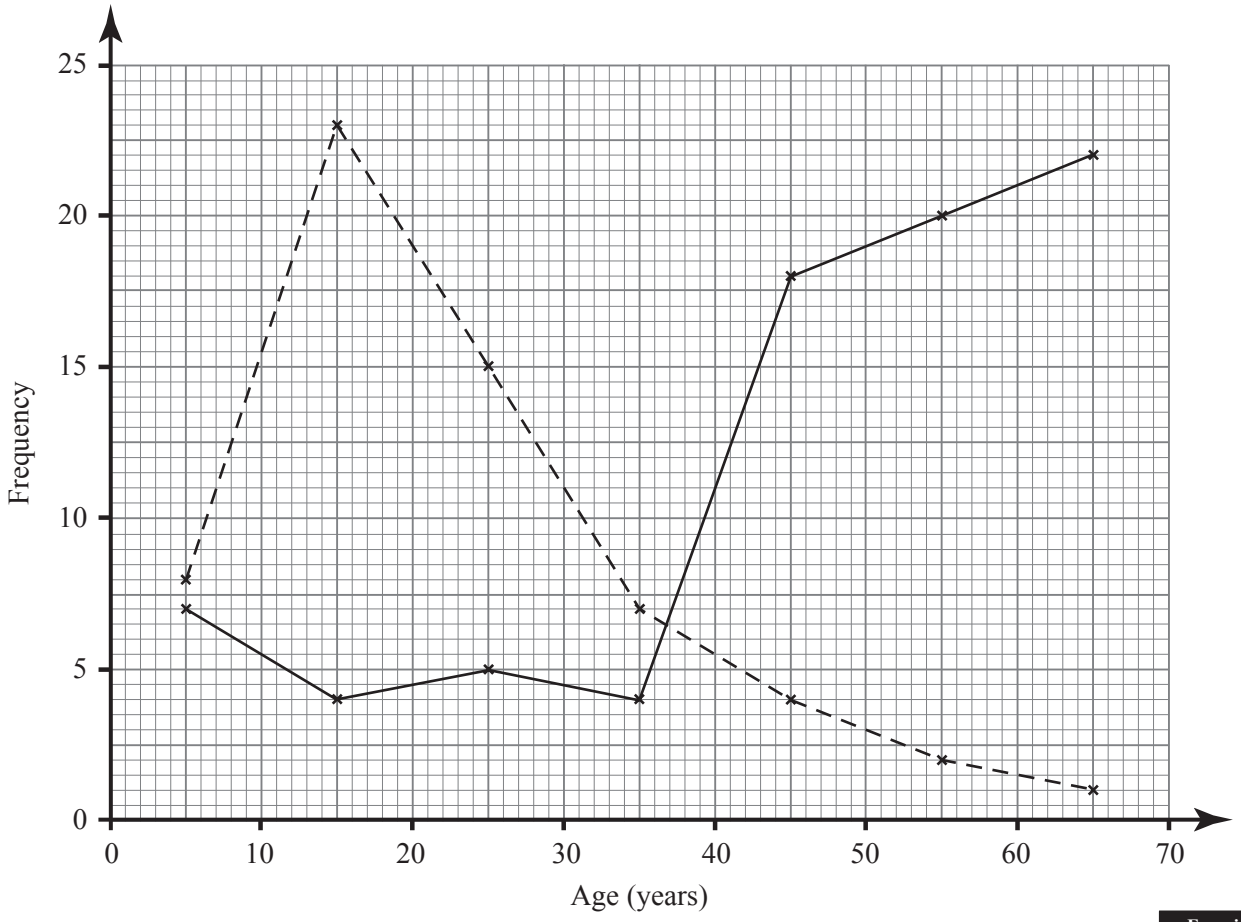
Answer _____ [1]

Examiner Only	
Marks	Remark

(b) The frequency polygon below (solid line) illustrates the data recorded at the library.

A second frequency polygon (broken line) illustrates the ages of people visiting a different place in the same town on the Saturday morning.

By considering the polygons suggest what the second place might be.
Give a reason for your answer.

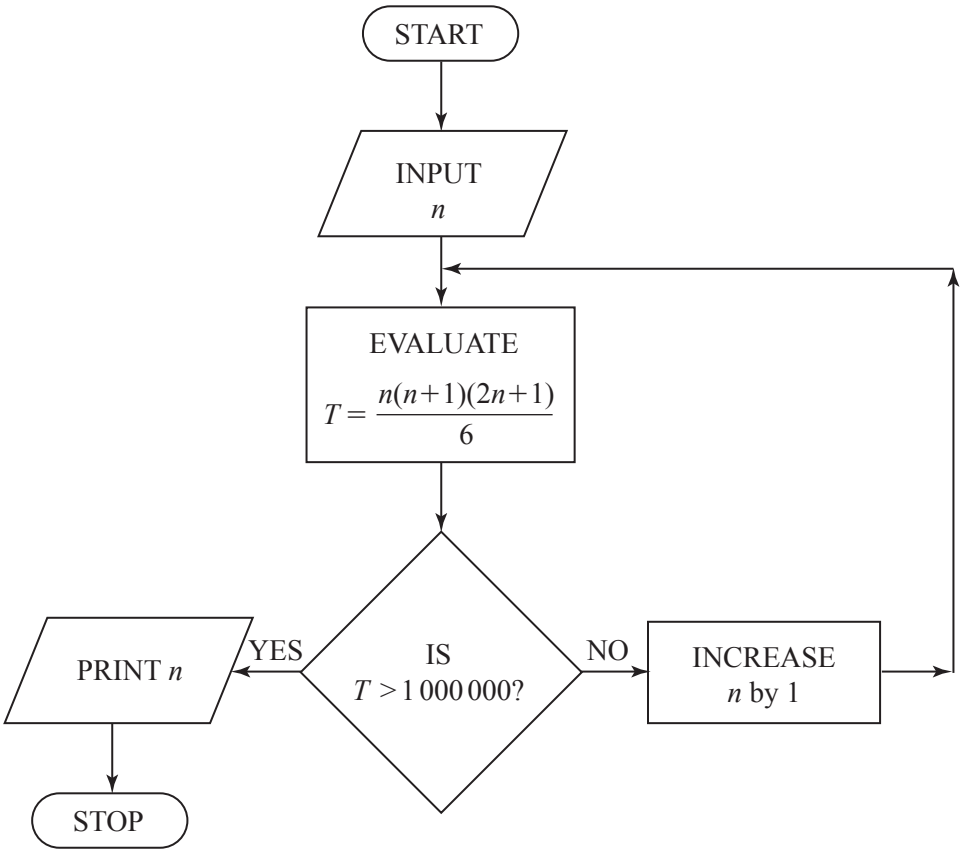


Answer _____ because _____

_____ [2]

Examiner Only	
Marks	Remark
Total Question 20	

21 The sum, T, of the first n squares, i.e. $1^2 + 2^2 + 3^2 + \ldots + n^2$, is known to be $\frac{n(n+1)(2n+1)}{6}$. The flow diagram can be used to find the least value of n for which T is greater than 1 000 000.



Examiner Only	
Marks	Remark

Listing each successive value of n and each corresponding value of T, use the flow diagram to find this value of n. Start the search with $n = 141$.

n	T
141	

Value printed _____ [4]

Examiner Only	
Marks	Remark
Total Question 21	

22 Use the method of trial and improvement to solve the equation

$$x^3 + 2x = 60$$

giving the answer correct to one decimal place.

Show all your working.

Answer $x =$ _____ [4]

Examiner Only	
Marks	Remark
Total Question 22	

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For Examiner's use only	
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