

Rewarding Learning

General Certificate of Secondary Education
2012

Candidate Number


## Mathematics

## Unit T2 (With calculator)

Foundation Tier

[GMT21]
*GMT21*
WEDNESDAY 6 JUNE $9.15 \mathrm{am}-10.45 \mathrm{am}$

## 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 $\mathbf{1 , 4} 4$ and 10.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is overleaf.
7417


## Quality of written communication will be assessed in this question.

1 (a) Show how to work out $\frac{7}{12}-\frac{1}{2}$ if you do not have a calculator.
(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 <br> children | 55 | 35 | 20 | 10 |
| Angle |  |  |  |  |

Draw a pie chart to illustrate this data.


Total Question 1
[4]
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2 (a) Draw accurately and label a triangle ABC with $\mathrm{AB}=7 \mathrm{~cm}$, angle $A=60^{\circ}$ and angle $B=70^{\circ}$. Start with the line $A B$ below.
A $\qquad$ B
(b) Calculate the size of angle $x$ in the kite below.


Diagram not drawn accurately

Answer $x=$ $\qquad$ [2]

| Examiner Only |  |
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3 Write in the missing numbers
(a) $\sqrt{2.25}+\square=4$
(b) $\square-3^{3} \quad=11$
(c) $\frac{3}{0.5^{2}}=\square$

Quality of written communication will be assessed in this question.
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 $\qquad$ by $£$ $\qquad$ [4]

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

| $x$ | 0 | 1 | 2 | 3 | 4 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $y$ | -3 |  | 1 |  | 5 |


(a) One age has been recorded inaccurately. Put an $\mathbf{X}$ through the inaccurate age and give a reason for your answer.

Reason
(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 | 5 | 7 | 7 | 8 | 8 | 8 | 9 |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 2 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 5 | 7 | 7 | Key: $3 \mid 2=32$ years |
| 3 | 2 | 2 | 4 | 6 | 6 |  |  |  |  |  |  |
| 4 | 1 | 2 |  |  |  |  |  |  |  |  |  |

(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 $\qquad$ - [2]

7 (a) Solve the equations:
(i) $3 x+11=17$

Answer $x=$ $\qquad$
(ii) $3(2 x-5)=4$

Answer $x=$ $\qquad$
(b) Write down the next two numbers in the sequence
$12,11,9,6$, $\qquad$ ,
(c) Simplify $3 b-2 g+4 b+7 g$

Answer $\qquad$

Total Question 7

|  |  |
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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:

$$
\text { number of euro }=\text { exchange rate } \times(\text { number of pounds }-3.5)
$$

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

Answer $\qquad$ euro [3]
(b) Explain how the formula would change if the bureau increased the charge to $£ 3.80$ for every transaction.
(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?

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

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

> Answer
$\qquad$ ${ }^{\circ}$ [1]
(b) What is the bearing of R from S ?

Answer $\qquad$ ${ }^{\circ}$ [1]
(c) The scale of the drawing is 1 cm to 4 km .

What is the actual distance between the two lighthouses?

Answer $\qquad$ km [3]

Total Question 9

[Turn over
7417

Quality of written communication will be assessed in this question．
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 $\qquad$

Reason 2 $\qquad$
$\qquad$

| Examiner Only |  |
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11 Liz buys $x$ markers at 90 p 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 $\qquad$

Answer $x=$ [4]

Total Question 11

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

Answer $\qquad$
(b) The heights of three flower pots are $45 \mathrm{~cm}, 30 \mathrm{~cm}$ and 10 cm .

Write the ratio of their heights in simplest form.

Answer $\qquad$ [1]
(c) Complete the following:
(i) $0 . \dot{6}$ can be written as the fraction $\qquad$
(ii) The recurring decimal $0.280280280 \ldots$ can be written using dot notation as $\qquad$
(d) Fill in the box to make the statement correct.

$$
\begin{equation*}
\frac{1}{\square}+\frac{1}{4}=\frac{9}{20} \tag{2}
\end{equation*}
$$

| Examiner Only |  |
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| Total Question 12 |  |
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13 (a) Calculate the circumference of a circular garden with radius 5.4 m .

Answer $\qquad$ m [2]
(b) The area of the rectangle below is $33 \mathrm{~cm}^{2}$.


Change $33 \mathrm{~cm}^{2}$ into $\mathrm{mm}^{2}$.

Answer $\qquad$ $\mathrm{mm}^{2}$ [2]
(c) Find the area of a triangle with base 9 cm and perpendicular height 6 cm .


Answer $\qquad$ [3]

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14 (a) Complete the following to write 252 as a product of prime factors. $252=2 \times 2 \times 3 \times$ $\qquad$ $\times$ $\qquad$
(b) Write 297 as a product of prime factors.

Answer $\qquad$
(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 $\qquad$ cm [2]

Examiner Only Marks $\quad$ Remark

Total Question 14


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 $£$ $\qquad$
(b) Last year Paul's house insurance cost $£ 250$.

This year the cost is $£ 268$. What is the percentage increase?

Answer $\qquad$ \% [3]

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16 Write down the nth term of the following sequences：
（a） $6,12,18,24, \ldots \ldots$

Answer $\qquad$ ［1］
（b） $3,8,13,18, \ldots$ ．

Answer $\qquad$ ［2］

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

（a）If the third side is 10 cm ，show why the triangle must be right－angled．
（b）If the triangle is not right－angled write down a possible length that the third side could have．

Answer $\qquad$ cm［1］

| Examiner Only |  |
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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 $\quad$ Remark
(b) One of the points seems unusual. Circle this point and suggest a possible reason for it.

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

Answer $\qquad$

19 (a) P is the point $(1,4) . \mathrm{Q}$ is the point $(7,-2)$. Find the co-ordinates of the midpoint of PQ .

Answer ( $\qquad$ , $\qquad$ [2]
(b) Calculate the size of the interior angle of a regular nonagon (nine-sided polygon).

Answer $\qquad$ - [2]
(c) Calculate the area of a semi-circle with diameter 6 cm .

## Answer

$\qquad$ $\mathrm{cm}^{2}$ [2]

| Examiner Only |  |
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| Marks | Remark |
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20 The table shows the ages of people visiting the town library one Saturday morning.
(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.


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[Turn over

Total Question 20 because $\qquad$

21 The sum, $T$, of the first $n$ squares, i.e. $1^{2}+2^{2}+3^{2}+\ldots+n^{2}$, is known to be $\frac{n(n+1)(2 n+1)}{6}$. The flow diagram can be used to find the least value of $n$ for which $T$ is greater than 1000000 .

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 $\qquad$ [4]信

Examiner Only


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

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

giving the answer correct to one decimal place.
Show all your working.

Answer $x=$ $\qquad$ [4]

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