GCSE MATHEMATICS

Foundation Tier  Paper 3  Calculator

Tuesday 13 June 2017  Morning  Time allowed: 1 hour 30 minutes

Materials
For this paper you must have:
• a calculator
• mathematical instruments.

Instructions
• Use black ink or black ball-point pen. Draw diagrams in pencil.
• Answer all questions.
• You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
• Do all rough work in this book. Cross through any work you do not want to be marked.

Information
• The marks for questions are shown in brackets.
• The maximum mark for this paper is 80.
• You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice
• In all calculations, show clearly how you work out your answer.
Answer all questions in the spaces provided

1. Circle the lowest of these temperatures.  [1 mark]

\[ -4.9°C \quad 0°C \quad -7°C \quad 0.1°C \]

2. Circle the expression that is four times bigger than \( n \).  [1 mark]

\[ n + 4 \quad 4n \quad \frac{n}{4} \quad n^4 \]

3. Circle the fraction greater than \( \frac{3}{10} \).  [1 mark]

\[ \frac{1}{3} \quad \frac{3}{11} \quad \frac{4}{15} \quad \frac{29}{100} \]
4  Circle the value of $2^5$  

10  25  32  64

5 (a) Simplify $a \times a \times a + b + b$  

Answer

5 (b) Simplify $5(x + 3) - x + 2$  

Answer

Turn over for the next question
Twelve cards numbered 1 to 12 are put into six pairs. Each pair has a total.

Complete the table to show the pairs and their totals.

<table>
<thead>
<tr>
<th>Cards</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 and 2</td>
<td>3</td>
</tr>
<tr>
<td>_____ and _____</td>
<td>9</td>
</tr>
<tr>
<td>_____ and _____</td>
<td>11</td>
</tr>
<tr>
<td>_____ and _____</td>
<td>14</td>
</tr>
<tr>
<td>_____ and _____</td>
<td>19</td>
</tr>
<tr>
<td>_____ and _____</td>
<td>22</td>
</tr>
</tbody>
</table>
7 Here is a number machine.

\[
\begin{align*}
\text{Input} & \quad \rightarrow \quad \text{Output} \\
x & \quad \rightarrow \quad \times 3 \quad \rightarrow \quad -2 \quad \rightarrow \quad y
\end{align*}
\]

7 (a) Work out the output when the input is 4

[1 mark]

Answer

7 (b) Work out the output when the input is \(-4\)

[1 mark]

Answer

Turn over for the next question
Here is information about the goals scored in some hockey games. Each game has four quarters.

**8 (a)** Which quarter was the mode for **away** goals? Circle your answer.  
[1 mark]

- [ ] 1st  
- [ ] 2nd  
- [ ] 3rd  
- [ ] 4th

**8 (b)** There were 10 games. Work out the mean number of goals per game.  
[2 marks]

Answer ____________________________
8 (c) In total, how many more home goals were scored than away goals? [2 marks]

Answer

8 (d) Rob says,

“More home teams must have won because there were more home goals.”

Is he correct?
Give a reason for your answer. [1 mark]
9 (a) List all the factors of 30 [2 marks]

Answer

9 (b) A factor of 30 is chosen at random.
What is the probability that it is a 2-digit number? [1 mark]

Answer
Each shape below has an area of 24 cm$^2$.

Complete the missing lengths.

[3 marks]

**Rectangle**

- cm
- 6 cm

**Triangle**

- 16 cm
- cm

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Turn over for the next question
11 A television channel shows 12 minutes of adverts in each half hour.
How many **minutes** of adverts does it show from 5 am to 11 pm? [3 marks]

Answer __________________________ minutes

12 Put these probabilities in order, starting with the least likely.

44%  \( \frac{1}{4} \)  0.404  \( \frac{4}{10} \) [2 marks]

Answer _______ , _______ , _______ , _______
A circle is drawn on a centimetre grid.

(a) Draw a tangent to the circle.  

(b) Grace works out that the area of the circle is more than 9 cm$^2$.  

Why must this be wrong?

Turn over for the next question
14 (a) The front elevation, side elevation and plan of a solid are all the same, as shown.

Write down the name of the solid. [1 mark]

Answer ______________________________________

14 (b) The front elevation, side elevation and plan of a solid are all the same, as shown.

Write down the name of the solid. [1 mark]

Answer ______________________________________
15 Show that there are exactly five 3-digit cube numbers.

[3 marks]
16 Triangles $ABC$ and $DEF$ are similar.

16 (a) Work out the value of $x$. [2 marks]

Answer

16 (b) Write down the size of angle $y$. [1 mark]

Answer __________ degrees
17 CD and PQ are lines of length 12 cm

17 (a) CE : CD = 1 : 2
Mark point E on the line with a cross.

[1 mark]

17 (b) PR : RQ = 1 : 3
Mark point R on the line with a cross.

[1 mark]
A shop sells two brands of battery.

Brand A
Pack of 8
Price £3.60

Brand B
Pack of 6
Price £2.94

One brand A battery powers a toy for 5 hours.
One brand B battery powers the same toy for $5\frac{1}{2}$ hours.

Which brand is better value?
You must show your working.

Answer ____________________________
19 The value of $x$ can be 2 or 5
The value of $y$ can be 3 or 12

19 (a) List the possible values of $xy$ [2 marks]

Answer

19 (b) Work out the least possible value of $\frac{x-y}{x}$
You must show your working. [2 marks]

Answer

Turn over for the next question
An exam has two papers.

Anil scores

33 out of 60 on paper 1

and

75 out of 100 on paper 2

Work out his percentage score for the exam.

[3 marks]

Answer %
21 Purple paint is made by mixing red paint and blue paint in the ratio $5 : 2$
Yan has 30 litres of red paint and 9 litres of blue paint.
What is the maximum amount of purple paint he can make? [3 marks]

Answer ____________________ litres

Turn over for the next question
This shape is made from two triangles and four congruent parallelograms.

For each statement, tick the correct box.

22 (a) The triangles are equilateral. [1 mark]

- Must be true
- Could be true
- Must be false

22 (b) The triangles are congruent. [1 mark]

- Must be true
- Could be true
- Must be false
23 (a) The length of a pipe is 6 metres to the nearest metre.

Complete the error interval for the length of the pipe.

Answer \[ \text{length} \in [\_\_, \_\_] \text{ m} \] 

23 (b) The length of a different pipe is 4 metres to the nearest metre.

Olly says,

“The total length of the two pipes is 11 metres to the nearest metre.”

Give an example to show that he could be correct.

[2 marks]
24.  $AB$, $CD$ and $EF$ are straight lines.

24 (a) Ava assumes that $AB$ and $CD$ are parallel.

What answer should she get for the size of angle $y$?

[4 marks]

Answer __________________________ degrees
In fact, 

$AB$ and $CD$ are not parallel

angle $w$ is $60^\circ$

What effect does this have on the size of angle $y$?

Tick a box.

- $y$ is bigger
- $y$ is the same
- $y$ is smaller

Show working to support your answer.

[3 marks]
There are 720 boys and 700 girls in a school.

The probability that a boy chosen at random studies French is $\frac{2}{3}$.

The probability that a girl chosen at random studies French is $\frac{3}{5}$.

25 (a) Work out the number of students in the school who study French. [3 marks]

Answer

25 (b) Work out the probability that a student chosen at random from the whole school does not study French. [2 marks]

Answer
26 Circle the expression equivalent to $x^2 - 4x - 12$

[1 mark]

$(x - 4)(x - 8)$  $(x + 3)(x - 4)$  $(x - 12)(x + 1)$  $(x + 2)(x - 6)$

27 How are the whole number solutions to A and B different?

A  Solve  $3 \leq 3x < 18$

B  Solve  $3 < 3x \leq 18$

[2 marks]

END OF QUESTIONS
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ANSWER IN THE SPACES PROVIDED
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