Thursday 7 June 2018 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.
• Fill in the boxes at the top of this page.
• 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 expression that can be written as $2y$. [1 mark]

   $y + y$, $y^2$, $2 + y$, $y \times y$

2. Circle the decimal that is greater than $\frac{3}{10}$ and less than $\frac{2}{5}$. [1 mark]

   0.32, 0.035, 0.4, 0.24

3. What is 625 as a power of 5? Circle your answer. [1 mark]

   $5^3$, $5^4$, $5^5$, $5^{125}$
4 Circle the order of rotational symmetry of this drawing.

0 2 4 8

5 Work out the value of $3^6 - \sqrt{841}$

Answer ________________________________

Turn over for the next question
Gemma has four groups of friends on a social media site. The table shows the number of friends in each group.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of friends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>8</td>
</tr>
<tr>
<td>Netball</td>
<td>8</td>
</tr>
<tr>
<td>School</td>
<td>26</td>
</tr>
<tr>
<td>Guides</td>
<td>11</td>
</tr>
</tbody>
</table>

6 (a) Which group is the mode? [1 mark]

Answer: Netball

6 (b) Gemma wants a pictogram to show the information. She has drawn the first two rows. Complete the pictogram. Remember to complete the key. [3 marks]

Key: ○ represents ______ friends

<table>
<thead>
<tr>
<th>Family</th>
<th>○○</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netball</td>
<td>○○</td>
</tr>
<tr>
<td>School</td>
<td></td>
</tr>
<tr>
<td>Guides</td>
<td></td>
</tr>
</tbody>
</table>
7  \( e \) is 3 more than \( d \).
\( f \) is 5 less than \( d \).

7 (a) Write an expression for \( e \) in terms of \( d \). \[1 \text{ mark}\]

Answer

7 (b) Write an expression for \( f \) in terms of \( d \). \[1 \text{ mark}\]

Answer

7 (c) Work out \( e - f \)
Simplify your answer. \[2 \text{ marks}\]

Answer

Turn over for the next question
The numbers 1 to 12 are put in a grid. 2, 4, 5, 7, 10 and 12 are shown.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each of the four sides of the grid must add up to 26.

Complete the grid using the numbers 1, 3, 6, 8, 9 and 11.

[3 marks]
9. In this question, use
   1 foot = 12 inches
   1 inch = 2.5 centimetres

Change 5 feet 8 inches to centimetres. [3 marks]

Answer ______________________________ cm

10. Which of these numbers has exactly four factors?
    Circle your answer. [1 mark]

    4  8  12  16

Turn over for the next question
11 Nick has a 6-digit code.
He remembers it as three 2-digit numbers.
   The first number is between 10 and 20
   The second number is 3 times the first number.
   The third number is 5 times the first number.
All six digits are different.
Work out the code.  [3 marks]

Answer

12 How many minutes are there in \( \frac{5}{4} \) hours?
Circle your answer.  [1 mark]

   315     325     515     525
Here is a formula for the amount of water needed to cook rice.

\[ w = 1.5r + 0.5 \]

\( w \) is the number of cups of water needed
\( r \) is the number of cups of rice to be cooked

13 (a) How many cups of water are needed to cook 7 cups of rice? [2 marks]

Answer

13 (b) How many cups of rice can be cooked with 20 cups of water? [3 marks]

Answer
14 (a) Use your calculator to work out \(9.95^2 \times 29.8\)
Give your answer as a decimal.
Write down your full calculator display. 

[1 mark]

Answer

14 (b) Is your answer to part (a) sensible?
Use approximations to decide.
You must show your working.

[3 marks]

Tick a box.

☐ Sensible
☐ Not sensible
15 (a) The graph of \( y = 4 - x \) for values of \( x \) from -2 to 5 is shown on the grid.

15 (b) On the grid, draw the graph of \( y = 2x - 5 \) for values of \( x \) from -2 to 5

[3 marks]

15 (b) Use your graph to solve \( 2x - 5 = 4 - x \)

[1 mark]

\[ x = \]
16 (a) \( BCD \) is a straight line.
Triangle \( ABC \) is equilateral.
\( CE = DE \)

Work out the size of angle \( x \).

[4 marks]

Answer \( \frac{1}{2} \) \( \frac{1}{2} \) degrees
16 (b) Amba is working out the size of an interior angle of a regular octagon.

Her method is \[ \text{Interior angle} = \frac{360}{8} \]

Is her method correct?

Tick a box.

[ ] Yes [ ] No

Give a reason for your answer.

[1 mark]

Turn over for the next question
Here is a map of an island with cities A, B and C.

The straight lines represent roads.

_Scale:_ 1 cm represents 200 km

17 (a) A is due West of B.

Write down the bearing of A from B.

[1 mark]

Answer ____________________________ °
17 (b) Umar drives from A to B on the route shown. Kaz drives from B to C on the route shown. Use the map to work out how much further Umar drives than Kaz. You must show your working. [5 marks]

Answer______________________km

Turn over for the next question
18 A shop sells raincoats and umbrellas. 
The scatter graph shows the monthly sales for 12 months.

Sales of raincoats and umbrellas

Sales of umbrellas (£)

Sales of raincoats (£)

18 (a) Write down the type of correlation shown by the graph. [1 mark]

Answer ____________________________

18 (b) The manager expects the sales of umbrellas next month to be £60

Draw a line of best fit to estimate the sales of raincoats next month. [3 marks]

Answer £ ____________________________
19 Multiply out \(x(x - 4)\)
Circle your answer.

\[x^2 - 4 \quad 2x - 4 \quad x^2 - 4x \quad -3x^2\]

[1 mark]

20 \(a : b = 5 : 2\)
How many times larger is \(a\) than \(b\)?
Circle your answer.

\[0.4 \quad 1.5 \quad 2.5 \quad 3\]

[1 mark]
21 (a) A circle has radius 4.2 cm
Work out the length of the circumference.
Give your answer to 1 decimal place.

[3 marks]

Answer __________________________ cm

21 (b) The circle below has centre O.
Draw a sector on the circle.

[1 mark]
Two ordinary fair dice are rolled.

(a) Complete the tree diagram.

(b) Work out the probability that both dice land on a number less than 3.

Answer

Turn over for the next question
23. Match each sequence to its description. One has been done for you.

- 1 1 2 3 5 8  [Arithmetic progression]
- 1 2 4 8 16 32  [Geometric progression]
- 1 2 3 4 5 6  [Fibonacci sequence]
- 1 3 6 10 15 21  [Triangular numbers]
- 1 4 9 16 25 36  [Cube numbers]
- 1 8 27 64 125 216  [Square numbers]
The table shows information about the population of a city.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>420 000</td>
<td>480 000</td>
</tr>
</tbody>
</table>

Liam claims,

“From 2011 to 2021 the population of the city will increase by the same percentage as from 2001 to 2011”

He works out,

population increase from 2001 to 2011 = 480 000 – 420 000
= 60 000

population in 2021 = 480 000 + 60 000
= 540 000

Does the population of 540 000 match his claim?

You must show your working.

[3 marks]

Answer

7
25 On three days, Ali throws darts at a target. Here are his results.

<table>
<thead>
<tr>
<th>Number of throws</th>
<th>Number of hits</th>
<th>Number of misses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Tuesday</td>
<td>30</td>
<td>22</td>
</tr>
<tr>
<td>Wednesday</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>

25 (a) Work out two different estimates for the probability of Ali hitting the target. [2 marks]

Answer ___________________ and ___________________

25 (b) Which of your two answers is the better estimate for the probability of Ali hitting the target? Give a reason for your answer. [1 mark]

Answer ___________________

Reason ___________________
26 Theo starts with savings of £18
James starts with no savings.

Each week from now,

Theo will save £4.50 and James will save £4

In how many weeks will Theo and James have savings in the ratio 15 : 8?

[3 marks]

Answer ____________________________

Turn over for the next question
A container is a hemisphere of radius 30 cm

Sand fills the container at a rate of 4000 cm$^3$ per minute.

Does it take less than a quarter of an hour to fill the container?
You must show your working. [3 marks]

Answer ____________________________________________
28 The length of each side of a regular pentagon is 8.4 cm to 1 decimal place.

28 (a) Complete the error interval for the length of one side. [2 marks]

\[ \text{cm} \leq \text{length} < \text{cm} \]

28 (b) Complete the error interval for the perimeter. [1 mark]

\[ \text{cm} \leq \text{perimeter} < \text{cm} \]

END OF QUESTIONS
There are no questions printed on this page
There are no questions printed on this page
There are no questions printed on this page

Copyright information

For confidentiality purposes, from the November 2015 examination series, acknowledgements of third party copyright material will be published in a separate booklet rather than including them on the examination paper or support materials. This booklet is published after each examination series and is available for free download from www.aqa.org.uk after the live examination series.

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders may have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements. If you have any queries please contact the Copyright Team, AQA, Stag Hill House, Guildford, GU2 7JL.

Copyright © 2018 AQA and its licensors. All rights reserved.