Wednesday 8 November 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 cube number.  
   \[100, 1000, 10,000, 100,000\]  
   [1 mark]

2. A fair ordinary dice is thrown once. 
   Circle the probability of getting a 2 or a 3 
   \[\frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{5}{6}\]  
   [1 mark]

3. Circle the decimal that is greater than \(\frac{1}{5}\) and less than \(\frac{1}{4}\) 
   \[0.152, 0.200, 0.215, 0.251\]  
   [1 mark]
4. What is a litre a unit of?
Circle your answer.  

| area | density | mass | capacity |

5. 2.5 kg of carrots cost £1.70
Work out the cost of 3.25 kg of carrots.

[3 marks]

Answer £ ____________________________

Turn over for the next question
Gina makes a sandwich using

- bread (B) or a roll (R)
- ham (H) or cheese (C)
- salad (S) or pickle (P)

6 (a) List all the possible types of sandwich Gina could make. One has been done for you.

B H S

6 (b) What fraction of the possible types of sandwich have cheese and pickle?

Answer __________________________
7. \(ABC\) is a right-angled triangle.
   
   \(A\) is the point \((-3, -2)\)
   
   \(B\) is the point \((1, -2)\)
   
   \(C\) is a point on the line \(y = 4\)

7 (a) Draw triangle \(ABC\) on the centimetre grid below.

[3 marks]

7 (b) Work out the area of triangle \(ABC\).

[2 marks]

Answer \[\text{cm}^2\]
8 (a) Complete the number machine so that \( q = 7r - 2 \)

\[ \text{Input} \quad r \quad \rightarrow \quad \square \quad \rightarrow \quad \square \quad \rightarrow \quad \text{Output} \]

[2 marks]

8 (b) Write down the output \( y \) in terms of \( x \).

\[ \text{Input} \quad x \quad \rightarrow \quad +5 \quad \rightarrow \quad \times3 \quad \rightarrow \quad \text{Output} \quad y \]

[1 mark]

Answer __________________________
A farmer has 580 eggs to put into boxes. The boxes come in three sizes:

- 20 eggs
- 12 eggs
- 6 eggs

He wants:
- at least 10 boxes of 20 eggs
- at least 15 boxes of 12 eggs
- at least 25 boxes of 6 eggs.

The farmer fills 54 boxes with the 580 eggs. Show how he does this.

[5 marks]

Answer:

- boxes of 20 eggs
- boxes of 12 eggs
- boxes of 6 eggs
Megan says,

“If you add any three multiples of 10 the total must be

a multiple of 10

and

a multiple of 3”

Is she correct?

You must show your working.

[2 marks]

Answer __________________________________________
A fair spinner has 12 equal sections.

Label each section A, B, C or D so that when the arrow is spun,

- the probability it lands on A is \( \frac{1}{6} \)
- the probability it lands on B is equal to the probability it lands on C
- the probability it lands on D is double the probability it lands on A.

[3 marks]
12 \( a - b = 5 \)

12 (a) Work out the value of \( 2(a - b) \) [1 mark]

Answer

12 (b) Work out the value of \( 7a - 7b \) [1 mark]

Answer

12 (c) Work out the value of \( b - a \) [1 mark]

Answer
A cube has edge length 0.9 metres.

Work out the total surface area of the cube.
Give your answer in square centimetres.

[3 marks]

Answer __________________________ cm²

Turn over for the next question
14 £1700 is invested for 3 years at 4% per year **simple** interest.

Work out the total interest.

[3 marks]

Answer £ ________________________________
Here is a map showing two towns, P and Q.

Scale: 1 cm represents 50 km

15 (a) Work out the actual distance between towns P and Q.  

Answer: ________________ km  

15 (b) Town R is 200 km due South of town P.  

Mark R on the map.
A train has 1 first-class carriage and 6 standard carriages.

The first-class carriage has 64 seats.
\[
\frac{3}{8}
\]
are being used.

Each standard carriage has 78 seats.
\[
\frac{7}{13}
\]
in each carriage are being used.

Are more than half the seats on the train being used?
You must show your working.

Answer

[5 marks]
17 Circle the equation which has the solution \( x = 6 \) [1 mark]

\[
x - 3 = \frac{x}{2} \quad x = \frac{3 + x}{2} \quad 3x = 36 \quad \frac{x}{6} = 0
\]

18 \( x \) is greater than 5 and less than or equal to 9
Circle the inequality that shows this. [1 mark]

\[
5 \leq x \leq 9 \quad 5 > x \geq 9 \quad 5 \leq x > 9 \quad 5 < x \leq 9
\]

Turn over for the next question

7
The following data comes from a large sample survey of the audience at a concert.

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
<th>Mean age (years)</th>
<th>Age range (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17%</td>
<td>20.3</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>83%</td>
<td>25.7</td>
<td>28</td>
</tr>
</tbody>
</table>

Make **three** comparisons of males and females at the concert. Use the headings given.

[3 marks]

Proportion of the audience ________

____

Average age ________

____

Spread of ages ________

____
20 In a tennis tournament,
98 players took part in the singles only
34 players took part in the doubles only
twice as many players took part in the singles as took part in the doubles.

How many players took part in both the singles and the doubles?
You may use the Venn diagram to help you.

[4 marks]

Answer ____________________________
21 The distance by road from Newport to London is 140 miles.

Tom travels by coach from Newport to London.
The coach leaves Newport at 1.30 pm

21 (a) He assumes the coach will travel at an average speed of 50 mph

Use his assumption to work out the arrival time in London. [3 marks]

Answer

21 (b) In fact, the coach has a lower average speed.

How does this affect the arrival time? [1 mark]
22 \(ABCD\) is a parallelogram.

\[AB = BP\]

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

[4 marks]

Answer \[\text{________ degrees}\]

Turn over for the next question
23. Show that 268 can be written as the sum of a power of 3 and a square number. [2 marks]

Answer: ________________________________
24. $y$ is inversely proportional to $x$ and $k$ is a constant.

Circle the correct equation. [1 mark]

\[ y = \frac{k}{x} \quad y = kx \quad y = \frac{x}{k} \quad y = x - k \]

25. Work out the \textbf{force} when the pressure is $24 \text{ N/m}^2$ and the area is $3 \text{ m}^2$.

Circle your answer. [1 mark]

0.125 N 8 N 27 N 72 N

\[ \text{pressure} = \frac{\text{force}}{\text{area}} \]
26 men and 38 women visit a restaurant.

44 of these people have a voucher.

Three times as many men as women do not have a voucher.

26 (a) Complete the frequency tree.

[4 marks]
26 (b) A voucher takes 15% off the bill.
After using the voucher, the bill for a meal is £27.20
How much was the bill before using the voucher? [3 marks]

Answer £ ____________________________

Turn over for the next question
27 (a) Rearrange \( v = u + at \) to make \( t \) the subject of the formula. [2 marks]

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Answer

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27 (b) Complete this table with consistent metric units. [2 marks]

<table>
<thead>
<tr>
<th>Distance</th>
<th>Time</th>
<th>Speed</th>
<th>Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>s</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
28 Multiply out and simplify \((x - 8)^2\) [2 marks]

Answer _______________________________
There are no questions printed on this page