Equipment

1. A black ink ball-point pen.
2. A pencil.
3. An eraser.
4. A ruler.
5. A pair of compasses.
6. A protractor.
7. A calculator

Guidance

1. Read each question carefully.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Information

1. Time: 1 hour 30 minutes
2. The maximum mark for this paper is 80.
3. You may use tracing paper.

<table>
<thead>
<tr>
<th>Question</th>
<th>Mark</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

© CORBETTMATHS 2019
1. The table shows information about five different laptops.

<table>
<thead>
<tr>
<th>Name</th>
<th>Price (£)</th>
<th>Mass (kg)</th>
<th>Thickness (cm)</th>
<th>Battery (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epic</td>
<td>£799</td>
<td>1.23</td>
<td>1.89</td>
<td>690</td>
</tr>
<tr>
<td>Bell</td>
<td>£1249</td>
<td>1.2</td>
<td>1.52</td>
<td>650</td>
</tr>
<tr>
<td>Lemon</td>
<td>£1599</td>
<td>1.37</td>
<td>1.49</td>
<td>720</td>
</tr>
<tr>
<td>HB</td>
<td>£799</td>
<td>1.28</td>
<td>1.7</td>
<td>740</td>
</tr>
<tr>
<td>Lazer</td>
<td>£1049</td>
<td>1.35</td>
<td>1.66</td>
<td>660</td>
</tr>
</tbody>
</table>

(a) Which laptop cost the most?

```
Lemon
```

(1)

Rebecca says that the Lemon laptop has a battery life of 12 hours.

(b) Show Rebecca is correct.

```
720 minutes = 720 ÷ 60 hours
= 12 hours
```

(1)
2. An airplane has economy and first class seating. There are \( s \) seats in each row in economy. There are \( t \) seats in each row in first class.

There are 9 rows in first class and 24 rows in economy.

Write down an expression, in terms of \( s \) and \( t \), for the number of seats on the airplane.

\[
245 + 9t
\]

(2)

3. Here are four digits.

\[
7 \quad 4 \quad 9 \quad 5
\]

(a) Use two of these digits to make the largest possible two-digit number.

\[
79
\]

(1)

(b) Use all four of these digits to make the four-digit number closest to 5000.

\[
4975
\]

(1)
4. \( \frac{3}{4} \) of a number is 24.

Find the number.

\[ 24 \div 3 = 8 \]

\[ 8 \times 4 = \]

\[ \text{32} \]

(2)

5. \( \frac{3}{5} \) of the buses arriving in a town are late.

(a) Write down the ratio of on time buses to late buses.

\[ \frac{2}{5} \text{ on time} \]

\[ \frac{2}{5} \div \frac{3}{5} = \]

\[ 2 : 3 \]

(1)

(b) Write down the percentage of buses that are late.

\[ \frac{3}{5} = 60\% \]

(1)

His scores are

\[ 120 \quad 71 \quad 80 \quad 14 \quad 90 \quad 117 \]

(a) Work out the range of his scores.

\[ 120 - 14 = \]

\[ 106 \]

(b) Work out the median of his scores.

\[ 14, 71, 80, 90, 117, 120 \]

\[ \overline{85} \]

(c) Work out the mean of his scores.

\[ 14 + 71 + 80 + 90 + 117 + 120 = 492 \]

\[ \div 6 = \]

\[ 82 \]
7. Ralph has 9 cards, each with a number on it.

\[ \begin{array}{cccccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\
\end{array} \]

He picks a card at random.

Write down the probability that the chosen card is a square number.

\[ \frac{3}{9} \]

(2)

8. Leah bought a new car costing £18,000.

She paid a deposit of £2,000.

Leah paid the rest of the money over 25 equal monthly payments.

How much was each monthly payment?

\[ 18000 - 2000 = \£16000 \]

\[ 16000 \div 25 = \] £640

(2)
Here is part of a bus timetable.

<table>
<thead>
<tr>
<th>Place</th>
<th>14:15</th>
<th>14:45</th>
<th>15:20</th>
<th>15:40</th>
<th>16:02</th>
<th>16:13</th>
<th>16:43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banbridge</td>
<td>14:37</td>
<td>15:07</td>
<td>15:42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dromore</td>
<td>14:48</td>
<td>15:18</td>
<td>15:53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belfast</td>
<td>15:18</td>
<td>15:48</td>
<td>16:23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Niall lives in Newry and his friend lives in Dromore.

Niall lives a 10 minute walk from Newry bus station.
His friend lives a 20 minutes walk from Dromore bus stop.
Niall wants to plan a journey to arrive at his friend’s house before 4pm.

Plan Niall’s journey.

Leave home: 14:05
  ↑
  10min walk
  ↓
Catch bus at Newry
  ↑
  14:15
  ↓
Arrive at Dromore
  ↑
  14:48
  ↓
  20 minute walk
  ↓
Arrive at Friend’s
  ↑
  15:08

(can also catch the 14:45 bus)
10. Robert is $x$ years old.
    Hannah is 7 years younger than Robert

    The sum of their ages is 61.

    (a) Form an equation in terms of $x$

    $$x + x - 7 = 61$$

    $$2x - 7 = 61$$

    (b) Solve the equation and work out Robert's age.

    $$2x - 7 = 61$$
    $$2x = 68$$
    $$x = 34$$

    34

    (2)
11. \( W = 8a - 3 \)

(a) Work out \( W \) when \( a = 7 \)

\[
8 \times 7 - 3 =
\]

\[
W = 53
\]  
(2)

(b) Make \( a \) the subject of \( W = 8a - 3 \)

\[
w + 3 = 8a
\]

\[
a = \frac{w + 3}{8}
\]  
(2)

12.

The volume of the cube is twice the volume of the cuboid.

Find the length of the cuboid.

Cube: \( V = 6^3 = 216 \text{cm}^3 \)

\[
\frac{216}{2} = 4 \times 4 \times y = 108
\]

\[
y = \frac{108}{16} = 6.75 \text{ cm}
\]  
(3)
13. Here is a pentagon.

Find the size of $x$.

\[
\begin{align*}
x - 15 \\
x + 15 \\
x + 20 \\
x + 20 \\
x - 10
\end{align*}
\]

\[
\frac{5x + 30}{\text{total interior angles of a pentagon} = 540^\circ}
\]

\[
5x + 30 = 540
\]

\[
x = \frac{510}{5}
\]

\[102^\circ\]
14. Martina wants to convert £3000 into Euros. The Post Office only has €20 notes.

The exchange rate is £1 = €1.17

(a) Work out how many €20 notes Martina will receive.

\[ 3000 \times 1.17 = 3510 \]
\[ \div 20 = 175.5 \]

The next day the exchange rate changes to £1 = €1.18

(b) What effect would this have on your answer to (a)?

\[ 3000 \times 1.18 \div 20 = 177 \]

She would get 2 more notes.
15. \( \xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16\} \)

\( A = \text{multiples of 3} \)
\( B = \text{multiples of 4} \)

(a) Complete the Venn diagram

(3)

One of the numbers is selected at random.

(b) What is the probability that the number is in the set \( A \cup B \)?

\[ A \cup B = \{3, 6, 9, 12, 15, 4, 8, 16\} \]

\[ \frac{8}{16} \]

(2)
16. Solve the simultaneous equations

\[
\begin{align*}
3x + 2y &= 23 \quad (1) \\
2x - y &= 6 \quad (2)
\end{align*}
\]

\((2) \times 2\)  \quad 4x - 2y = 12  \quad (3)

\((1) \times 3\)  \quad 7x = 35

\quad x = 5

**Substitute into (1)**

15 + 2y = 23

\quad 2y = 8

\quad y = 4

\[
\begin{align*}
x &= 5 \\
y &= 4
\end{align*}
\]
17. The frequency table shows the piano grade of 17 students in a class.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

3 new students, who are all Grade 6, join the class.

The teacher says the median piano grade will increase. Is she correct? You must explain your answer.

Original median will be the 9th student, grade 4.

3 new students means the median will be between the 10th & 11th student, which is between 4 & 5.

Yes, she is correct.

(3)
18. The ratio of boys to girls in a school is $4 : 5$
There are 220 boys in the school.

How many students attend the school?

\[220 \div 4 = 55\]

\[55 \times 9 = \]

\[495\]
19. Shown below are two identical regular polygons and an equilateral triangle.

Calculate the number of sides each regular polygon has.

**Equilateral triangle has 60° angles**

\[ 2x + 60 = 360 \]

\[ x = 150° \text{ (interior angle)} \]

\[ \therefore \text{ exterior angle} = 180 - 150 = 30° \]

\[ 360 \div 30° = 12 \]

\( \text{(4)} \)
20. Material A has a density of 5.8g/cm³. Material B has a density of 4.1g/cm³.

377g of Material A and 1.64kg of Material B form Material C.

Work out the density of Material C.

\[ A: \quad V = \frac{M}{\rho} = \frac{377}{5.8} = 65\text{cm}^3 \]

\[ B: \quad V = \frac{M}{\rho} = \frac{1640}{4.1} = 400\text{cm}^3 \]

\[
\frac{V}{\text{cm}^3} = 465 \quad \text{cm}^3
\]

\[ M = 377 + 1640 = 2017\text{g} \]

\[ \text{density} = \frac{2017}{465} = 4.34 \text{g/cm}^3 \]
21. Here is a right angle triangle.

25cm

7cm

24cm

Calculate the area of the triangle.

\[25^2 - 7^2 = 576\]

\[\sqrt{576} = 24\]

\[\text{area} = \frac{1}{2} \times 24 \times 7 = \]

\[84 \text{ cm}^2\]

(5)
22. (a) Complete the table of value for \( y = \frac{4}{x} \)

<table>
<thead>
<tr>
<th>x</th>
<th>0.5</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>8</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0.5</td>
<td>0.4</td>
</tr>
</tbody>
</table>

(b) On the grid, draw the graph of \( y = \frac{4}{x} \) for \( 0.5 \leq x \leq 10 \)
23. The population of an island is 52000 correct to 2 significant figures.

   (a) Write down the lowest possible population of the island.

      $51\,500$ 

      (1)

   (b) Write down the greatest possible population of the island.

      $52\,499$ 

      (1)

24. Evie is given a 22% pay rise.
   Her new salary is £21960

   Work out what Evie's salary was before the pay rise.

   \[
   \text{original} \times 1.22 = 21960 \\
   21960 \div 1.22 = 18000
   \]

   £ 18000 

   (2)
24.

(a) Complete the table of values for \( y = (x - 1)(x - 2) \)

<table>
<thead>
<tr>
<th>( x )</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>12</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

(b) On the grid, draw the graph of \( y = (x - 1)(x - 2) \) for the values of \( x \) from -2 to 3

(c) Use your graph to find estimates of the solutions to the equation \((x - 1)(x - 2) = 5\)

\( x = -0.75 \) \( x = 5.75 \)