Fill in these boxes and read what is printed below.

Full name of centre  

Town

Forename(s)  

Surname  

Number of seat

Date of birth

Day

Month

Year

Scottish candidate number

1 You may NOT use a calculator.

2 Write your working and answers in the spaces provided. Additional space is provided at the end of this question-answer book for use if required. If you use this space, write clearly the number of the question involved.

3 Full credit will be given only where the solution contains appropriate working.

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Use blue or black ink. Pencil may be used for graphs and diagrams only.
**FORMULAE LIST**

Circumference of a circle: \( C = \pi d \)
Area of a circle: \( A = \pi r^2 \)

Theorem of Pythagoras:
\[
\begin{align*}
    a^2 + b^2 &= c^2 \\
    \end{align*}
\]

Trigonometric ratios in a right angled triangle:
\[
\begin{align*}
    \tan x^\circ &= \frac{\text{opposite}}{\text{adjacent}} \\
    \sin x^\circ &= \frac{\text{opposite}}{\text{hypotenuse}} \\
    \cos x^\circ &= \frac{\text{adjacent}}{\text{hypotenuse}} \\
\end{align*}
\]
All questions should be attempted.

1. (a) Find $8 \cdot 31 - 5 \cdot 6$.

(b) Find $0.029 \times 400$.

(c) Find $\frac{2}{7}$ of 434.

2. A college class consists of 8 male and 12 female students.
   A student is chosen at random from the class.
   What is the probability that the student is male?
   Give your answer as a fraction in its simplest form.
3. The weight of a grain of salt is about 0.0000586 grams. Write this weight in standard form.

4. Linda sells make-up. Her basic pay is £50 per week. She is also paid 30% commission on all sales over £200. How much is she paid altogether in a week when she sells £620 worth of make-up?
5. (a) Complete the table below for \( y = 0.5x + 3 \).

<table>
<thead>
<tr>
<th>( x )</th>
<th>-8</th>
<th>0</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Draw the line \( y = 0.5x + 3 \) on the grid.
6. Two hundred teenagers were asked how many songs they had downloaded during the previous week. The frequency table below shows their responses.

<table>
<thead>
<tr>
<th>Number of Songs</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>72</td>
</tr>
<tr>
<td>7</td>
<td>53</td>
</tr>
<tr>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
</tr>
</tbody>
</table>

(a) Write down the modal number of songs downloaded.

(b) Find the range of the number of songs downloaded.
6. (continued)

(c) Complete the table below and find the mean number of songs downloaded.

<table>
<thead>
<tr>
<th>Number of Songs</th>
<th>Frequency</th>
<th>Number of Songs $\times$ Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>38</td>
<td>190</td>
</tr>
<tr>
<td>6</td>
<td>72</td>
<td>432</td>
</tr>
<tr>
<td>7</td>
<td>53</td>
<td>371</td>
</tr>
<tr>
<td>8</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>Total = 200</td>
</tr>
</tbody>
</table>
7. (a) The formula for the volume of this shape is

\[
\text{Volume} = \text{area of end} \times \text{length}
\]

The end of this shape is a triangle.
Use the formula to work out the volume of this shape.

(b) This cuboid has the same volume as the shape shown above.
Find the height of the cuboid.
8. Find the missing number in each machine.

(a)

\[
\begin{array}{c}
\text{IN} \\
-3
\end{array} \quad \text{multiply by } (-2) \quad \text{subtract } 17 \quad \text{OUT} \quad ?
\]

(b)

\[
\begin{array}{c}
\text{IN} \\
? \\
\end{array} \quad \text{multiply by } (-2) \quad \text{subtract } 17 \quad \text{OUT} \quad -35
\]

[Turn over for Question 9 on Page ten]
9. Solve algebraically the inequality

\[ \frac{1}{4}n - 2 < 10. \]
Fill in these boxes and read what is printed below.

1. **You may use a calculator.**

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\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}} \\
\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}
\]
1. It will take Hassan 3 hours 40 minutes to drive from Dundee to Stranraer.

He must be in Stranraer by 2.15 pm.

What is the latest time he should leave Dundee?
2. A recipe lists the ingredients needed to make 4 portions of chilli con carne.

<table>
<thead>
<tr>
<th>Ingredients for 4 portions of chilli con carne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minced beef</td>
</tr>
<tr>
<td>Onions</td>
</tr>
<tr>
<td>Chilli powder</td>
</tr>
<tr>
<td>Kidney beans</td>
</tr>
<tr>
<td>Chopped tomatoes</td>
</tr>
</tbody>
</table>

How many grams of minced beef would be needed to make 9 portions of chilli con carne?
3. Multiply out the brackets and simplify

\[4(2 - 3x) + 5(4x + 1)\].

4. Factorise

\[15a + 12\].

Marks

3

2

[Turn over
Carla likes to keep fit. She plans a workout by choosing activities from an exercise DVD. She can choose from the following activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Activity time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobics</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Yoga</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Jogging</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Toning</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Tums and Hips</td>
<td>12 minutes</td>
</tr>
</tbody>
</table>

Carla wants to choose three different activities. She wants to exercise for a minimum of 60 minutes.

One combination of three different activities that Carla can choose is shown in the table below.

<table>
<thead>
<tr>
<th>Aerobics 30 minutes</th>
<th>Yoga 25 minutes</th>
<th>Jogging 20 minutes</th>
<th>Toning 15 minutes</th>
<th>Tums and Hips 12 minutes</th>
<th>Total Time minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>75</td>
</tr>
</tbody>
</table>

Complete the table to show all the possible combinations of three different activities that Carla can choose.
6. The stem and leaf diagram below shows the heights of the girls in a Primary 7 class.

**HEIGHTS**

Girls

11 | 1 6  
12 | 2 5 9  
13 | 0 1 6 8 8  
14 | 3 4 7  

12 | 5 represents 125 centimetres

(a) What height is the tallest girl?

(b) Find the median height.

The stem and leaf diagram below shows the heights of both the boys and the girls in this class.

**HEIGHTS**

Boys          Girls

9 8 5 1 | 11 | 1 6  
8 7 4 3 3 | 12 | 2 5 9  
6 2 1 13 0 1 6 8 8  
7 | 14 | 3 4 7  

12 | 5 represents 125 centimetres

(c) Compare the heights of the boys with the girls in this class.

Comment on the overall difference.
7. Solve algebraically the equation

\[ 5y + 19 = 61 - 2y. \]
8. A ladder which is 5.2 metres long is placed against a wall. The foot of the ladder is 1.6 metres from the wall. The size of the angle between the ladder and the ground is $x^\circ$. Calculate $x$.

Do not use a scale drawing.
9. Whistler downhill ski course is 3.1 kilometres long. Finlay completed the course in 2 minutes 5 seconds. Find his average speed in \textbf{metres per second}. 

\textbf{Marks}

3
10. The table below shows the number of visitors to Ballyvarick Castle from April to September.

<table>
<thead>
<tr>
<th>Month</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors</td>
<td>2000</td>
<td>3000</td>
<td>4400</td>
<td>7800</td>
<td>8600</td>
<td>5400</td>
</tr>
<tr>
<td>(to nearest hundred)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On the grid below, draw a **line** graph to show this information.
11. Margaret insures her house which is worth £105,000.

The annual premium is £3·20 for every £1000 worth of cover.

She is given a discount of \( \frac{1}{8} \) of her annual premium.

How much does Margaret pay to insure her house?
12. A room in the Caledonian Hotel in New York costs 280 dollars per night plus 17% tax.

The exchange rate is 1·51 dollars to the pound.

Find the cost of the room per night.
Give your answer in pounds and pence.
13. Use the formula below to find the value of $S$ when $n = 6$.

$$S = \frac{n^2 + 3n}{4}$$
14. The diagram shows the end view of a building. Calculate the total height of the building. **Do not use a scale drawing.**
15. A market trader buys a box of twelve shirts for £80. He sells them for £9 each.

(a) How much profit does he make altogether?

(b) Express his profit as a percentage of what he paid for the shirts.
16. A section of lawn edging consists of a rectangle with five equal semi-circles at the top.

Calculate the area of the section in square centimetres.
Give your answer correct to the nearest square centimetre.