# National Qualifications 2013

## Mathematics

### Standard Grade

**Foundation Level**

**Paper 1**

**Non-calculator**

**FRIDAY, 3 MAY** 9.00 AM – 9.20 AM

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**Fill in these boxes and read what is printed below.**

<table>
<thead>
<tr>
<th>Full name of centre</th>
<th>Town</th>
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<table>
<thead>
<tr>
<th>Forename(s)</th>
<th>Surname</th>
<th>Number of seat</th>
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<tbody>
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</table>

**Date of birth**

Day | Month | Year | Scottish candidate number
--- | --- | --- | ---

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<table>
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</table>

1. **You may NOT use a calculator.**

2. **Answer as many questions as you can.**

3. **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.

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

5. **Before leaving the examination room you must give this book to the Invigilator.** If you do not, you may lose all the marks for this paper.

Use **blue or black ink.** Pencil may be used for graphs and diagrams only.
1. Work out the answers to the following.
   (a) $6427 + 125$

   WORKING

   ANSWER

   1

   (b) $47.2 \times 3$

   WORKING

   ANSWER

   1

   (c) 20% of £500

   WORKING

   ANSWER £
2. In a golf club, \(\frac{1}{4}\) of the members vote to increase the membership fees.

The golf club has 720 members. How many members vote to increase the membership fees?

**WORKING**

**ANSWER** members

2
3. A health spa offers the following treatments during a day visit.

Session 1 can be **Yoga** or **Aromatherapy**
Session 2 can be **Sauna** or **Facial**
Session 3 can be **Manicure** or **Pedicure**

The table below shows one possible combination.

<table>
<thead>
<tr>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yoga</td>
<td>Facial</td>
<td>Pedicure</td>
</tr>
</tbody>
</table>

Complete the table to show five other possible combinations.
4. Calculate the size of the shaded angle.

WORKING

ANSWER °
George is going to knit a sweater.
He needs to buy 10 balls of wool and 2 pairs of knitting needles.

One ball of wool costs £3.
One pair of knitting needles costs £2.50.
How much will it cost George to knit the sweater?

WORKING

ANSWER £
6. A crossing patrol sign is made using a pole with a circle on top.

The crossing patrol sign is 190 centimetres long.
The pole is 140 centimetres long.
Calculate the radius of the circle.

**WORKING**

**ANSWER**

3 centimetres
The drawing shows Mary’s lawn.

(a) Mary has to clip the grass round the edge of the lawn.

What length of edge does Mary have to clip?

WORKING

ANSWER

(b) Mary takes 10 minutes to clip the 20 metre edge of her lawn.

If she continues to work at the same rate, how long will it take her to clip all the edges?

WORKING

ANSWER
8. Study the calculations shown below.

\[
\begin{align*}
1 \times 1 &= 1 \\
11 \times 11 &= 121 \\
111 \times 111 &= 12321 \\
1111 \times 1111 &= 1234321
\end{align*}
\]

What is the value of \(11111 \times 11111\)?

**ANSWER**
9. A multi-storey car park has 3 levels underground and 5 levels above ground. Ground level is marked Level 0. The levels are connected by a lift.

When the lift starts at Level 2 and goes down 3 levels, it arrives at Level –1.

(a) The lift starts at Level 1 and goes down 4 levels. Where will it arrive?

(b) The lift starts at Level –2, goes up 6 levels, then down 5 levels. Where will it arrive?
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</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
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</tr>
<tr>
<td></td>
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Use **blue** or **black ink.** Pencil may be used for graphs and diagrams only.
1. A rectangular flag is shown below.

![Diagram of a rectangular flag]

Calculate the area of the flag.

**WORKING**

**ANSWER** square centimetres
2. The scale drawing of a car is shown below.

(a) Measure the length of the car in centimetres.

ANSWER ____________ centimetres

The scale of the drawing is
1 centimetre represents 50 centimetres.

(b) Find the actual length of the car in centimetres.

WORKING

ANSWER ____________ centimetres
3. The pattern below is made with tiles shaped as follows.

Draw three more tiles to continue the pattern.

YOU MAY USE THE EXTRA DIAGRAMS ON THE OPPOSITE PAGE FOR WORKING IF YOU WISH.
3. (continued)
4. Mrs Walsh is making some home improvements. She needs the joiner, plumber and electrician to **work together** for 3 days in October.

These are the dates that they are available in October.

Joiner 8th ➞ 20th  
Plumber 15th ➞ 22nd  
Electrician Any day except Fridays, Saturdays and Sundays

Use the calendar for October, shown below, to find the 3 dates that Mrs Walsh can book the joiner, plumber and electrician to work together.

**OCTOBER**

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
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<td>21</td>
<td>22</td>
<td>23</td>
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<td>25</td>
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<td>27</td>
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<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WORKING**

**ANSWER**
5. A cuboid and a cube are shown below.

(a) Calculate the volume of the cuboid.

WORKING

ANSWER \( \text{cubic centimetres} \)

(b) Which shape has the larger volume?

You must give a reason for your answer.

WORKING

ANSWER (WITH REASON)
6. David is taking his 3 grandchildren to the cinema.
He buys the tickets online.

<table>
<thead>
<tr>
<th>CINEMA: Cost of tickets</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£8.20</td>
</tr>
<tr>
<td>Child</td>
<td>£5.30</td>
</tr>
<tr>
<td>Senior</td>
<td>£5.40</td>
</tr>
<tr>
<td>Student</td>
<td>£5.60</td>
</tr>
<tr>
<td>Online Booking Fee</td>
<td>£0.50 per ticket</td>
</tr>
</tbody>
</table>

David’s ticket is at the senior rate.  
His grandchildren’s tickets are all at the child rate.  
What was the total cost?

**WORKING**

**ANSWER** £
7. Posters are put on a wall using drawing pins at their corners as shown below.

1 poster
4 drawing pins

2 posters
6 drawing pins

3 posters

(a) Complete the table.

<table>
<thead>
<tr>
<th>Number of posters</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of drawing pins</td>
<td>4</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Write a rule for finding the number of drawing pins if you know the number of posters.

**WORKING**

**RULE**
8. Eve is paid £7.50 per hour.
   (a) How much is Eve paid for working 4 hours?

   WORKING

   ANSWER £

   (b) When Eve works overtime, she is paid double time.
   Eve is paid £90 for working overtime.
   How many hours of overtime did she work?

   WORKING

   ANSWER hours
9. The pie chart shows how the Khan family spend their annual income.

Khan Family – Annual Income

- Food 17%
- Transport
- Housing 35%
- Other 27%

(a) What percentage of the Khan family’s annual income is spent on transport?

WORKING

ANSWER %

(b) The Khan family’s annual income is £32 000.

How much money does the Khan family spend on food?

WORKING

ANSWER £
10. A number is called a palindrome if it reads the same backwards as forwards. Some examples are shown below.

161  212  353  383

Write down the first number, bigger than 475, that is a palindrome.

WORKING

ANSWER
11. The opening times of a Recycling Centre are shown below.

<table>
<thead>
<tr>
<th>Recycling Centre Opening Times</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summer (April to September)</strong></td>
</tr>
<tr>
<td>Mon – Fri</td>
</tr>
<tr>
<td>Sat – Sun</td>
</tr>
<tr>
<td><strong>Winter (October to March)</strong></td>
</tr>
<tr>
<td>Mon – Fri</td>
</tr>
<tr>
<td>Sat – Sun</td>
</tr>
</tbody>
</table>

For how long is the Recycling Centre open on Saturday 9th February?

WORKING

<table>
<thead>
<tr>
<th>ANSWER</th>
<th>hours</th>
<th>minutes</th>
</tr>
</thead>
</table>

3
The number of children with broken bones attending a hospital is shown in the table below.

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of children</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>8</td>
</tr>
<tr>
<td>February</td>
<td>7</td>
</tr>
<tr>
<td>March</td>
<td>7</td>
</tr>
<tr>
<td>April</td>
<td>7</td>
</tr>
<tr>
<td>May</td>
<td>4</td>
</tr>
<tr>
<td>June</td>
<td>7</td>
</tr>
<tr>
<td>July</td>
<td>9</td>
</tr>
<tr>
<td>August</td>
<td>4</td>
</tr>
<tr>
<td>September</td>
<td>5</td>
</tr>
<tr>
<td>October</td>
<td>2</td>
</tr>
<tr>
<td>November</td>
<td>5</td>
</tr>
<tr>
<td>December</td>
<td>7</td>
</tr>
</tbody>
</table>

Calculate the mean number of children with broken bones attending the hospital per month.

WORKING

ANSWER

children

4
13. The ancient Mayan civilization in Mexico used a counting system based on dots and bars.

The chart below shows some numbers in the Mayan counting system.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

In our counting system, \(3 + 5 = 8\)

In the Mayan counting system, \(\bullet\bullet\bullet + \underline{\bullet\bullet\bullet\bullet\bullet\bullet\bullet\bullet\bullet} = \underline{\bullet\bullet\bullet\bullet\bullet\bullet\bullet\bullet\bullet}\)

(a) Write the calculation \(4 + 6 + 7\) in the Mayan counting system.

**ANSWER**

(b) Write the answer to \(4 + 6 + 7\) in the Mayan counting system.

**WORKING**

**ANSWER**
14. A tractor tyre is 35 centimetres high when positioned as shown below.

(a) Write 35 centimetres in metres.

WORKING

ANSWER metres

(b) A farmer stacks tractor tyres in piles.

For safety reasons, the maximum height of a pile of tyres is 2 metres.

What is the maximum number of these tyres which can be safely stacked in a single pile?

WORKING

ANSWER tyres
[BLANK PAGE]