Maths Subject Knowledge

Aim

The aim of this audit is for you to assess your own mathematical understanding to enable you to identify the areas that you need to work on during the time that you are on the course. You will use the audit to add to your personal action plan for developing your subject knowledge in mathematics. The audit will also indicate to the tutors the areas of mathematics where a number of trainees need help. This audit contributes to the following standard for Qualified Teacher Status:

**TS3: Demonstrate good subject and curriculum knowledge**

- Have a secure knowledge of the relevant subject(s) and curriculum areas, foster and maintain pupils’ interest in the subject, and address misunderstanding.
- Demonstrate a critical understanding of developments in the subject and curriculum areas, and promote the value of scholarship.
- If teaching early mathematics, demonstrate a clear understanding of appropriate teaching strategies.

As tutors we appreciate that you will all bring different experiences of mathematics to the course. Some of you will be confident knowledgeable mathematicians whilst others of you will come with a less confident attitude and may have forgotten or not understood some of the maths that you did at school. Our aim is that by the time you leave the course to be teachers that you will be confident, capable and enthusiastic mathematicians and you can pass that confidence, knowledge and enthusiasm to your pupils.

The maths content in this audit is at a level of expectation for high ability year six children. You will have the opportunity to reflect on the methods and strategies you used and possible errors and misconceptions that may be made. It will also give you the opportunity to consider the steps of progression in the different strands of primary mathematics to support you in your teaching, at whatever age-range you teach.

You need to complete the mathematics self-audit over the next week. It should take you from 1 to 2 hours.

You should complete the audit **without** reference to books and websites.

You should **not** use a calculator in any section.

The aim of this audit is to enable us to point you in the direction of books, websites and peers who can help you improve your mathematical subject knowledge and to choose which subject knowledge areas to provide tutorials on. **There is therefore no point in producing a result that does not reflect your ability!**

After Christmas you will take a similar audit in test conditions. This is to help you track your progress and monitor your own understanding of the mathematics curriculum.

Please bring along a copy of your needs analysis form to your first maths session.
Place Value and Properties of Number

1. Write a number in the box to make this correct:

\[ 0.627 = 0.6 + 0.02 + \square \]

2. Place these numbers in order of size, starting with the smallest:

\[ 0.19 \quad 0.9 \quad 0.091 \quad 0.109 \]

3. Circle the number closest in value to 0.1:

\[ 0.01 \quad 0.05 \quad 0.11 \quad 0.2 \quad 0.9 \]

4. Write this as a numeral:

One million, two hundred and eighteen thousand and seventy-four.

5. Here is a number line. Draw an arrow to show the position of 0.111:

6. Write all the factors of 24:

7. Which two square numbers can be added together to make 61?
8. List all the prime numbers between 15 and 30: 

9. Write in the missing numbers in this number sequence:

\[
\begin{array}{cccccc}
\quad & \quad & 11, & 18, & \quad & 39 \\
\quad & \quad & \quad & \quad & \quad & \\
\quad & \quad & \quad & \quad & \quad & \\
\end{array}
\]

10. Circle two numbers with a difference of 8:

\[
\begin{array}{cccccccc}
-5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\
\quad & \quad & \quad & \quad & \quad & \quad & \quad & \quad & \quad & \\
\quad & \quad & \quad & \quad & \quad & \quad & \quad & \quad & \quad & \\
\end{array}
\]

Total: 


Calculate the following and show your working for each.

1. \( 0.8 \times 0.06 = \) 

2. \( 368 - 67.3 = \) 

3. \( 78 \div 0.02 = \) 

4. \( 2703 \times 5.6 = \)
5. \[18837 \div 52 = \]  
   (Answer this question without leaving a remainder, i.e. continue into decimal places)

6. Multiply 578 by 64:

7. Calculate \[900 \div (45 \times 4) = \]

8. Write in the missing digit:

   \[92 \div 14 = 28\]

9. Draw brackets to make this number sentence correct:

   \[7 + 8 \times 12 - 3 = 135\]

10. Solve the following problem:

    Miss Mills is making jam to sell at the school fair. 
    Strawberries cost £7.50 per kg. 
    Sugar costs 79p per kg. 
    10 glass jars cost £6.90. 
    She uses 12kg of strawberries and 10kg of sugar to make 20 jars full of jam. 
    Calculate the total cost to make 20 jars full of jam.

    Show your working below:

    Total: £
1. Find 42% of £240.

2. Order these from lowest to highest:

\[
\begin{align*}
4/5 &, 6/10 &, 0.67 &, 1/3 &, 2/5 &, 1/2 &, 0.75 &, 9/10 \\
\end{align*}
\]

3. This square is divided into three parts.

Part A is 1/3 of the area of the square.
Part B is 2/5 of the area of the square.
What fraction of the area of the square is part C?

\[C = \] 

4. Calculate \( \frac{3}{4} \div 2 = \)

5. In a survey, the ratio of the number of people who preferred milk chocolate to those who preferred plain chocolate was 5 : 3. 46 more people preferred milk chocolate, to plain chocolate. How many people were in the survey? Show your working.

6. Calculate \( \frac{5}{12} \) of 372.

7. Write in the missing number: 30% of 60 is
8. Write in the missing number: 30% of \( \_ \) is 60.

9. What is the total of \( \frac{6}{10} \) and \( \frac{6}{5} \)? Write your answer as a mixed number.

10. The ratio of Alex’s age to his sister’s age is 7:4. If Alex is 21, how old is his sister?

Geometry, Shape and Space

1. Here is a square grid. Two sides of a kite are drawn on the grid. Complete the kite by drawing the two missing sides and draw on the lines of symmetry. Use a ruler.
2. The diagram shows 6 shaded squares.

K is the point (20, 10). What are the coordinates of L and M? (2)

L is (_, _)  M is (_, _)

3. The diagram shows three straight lines.

Work out the sizes of angles a, b and c.

a = _____°

b = _____°

\[30°\] Not drawn accurately

c = _____°

4. An isosceles triangle has a perimeter of 12 cm. One of its sides is 5 cm. What could length of each of the other two sides be? Two different answers are possible.

<table>
<thead>
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<th>cm</th>
<th>and</th>
<th>cm</th>
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<td>cm</td>
<td>and</td>
<td>cm</td>
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</table>
5. This cube has shapes drawn on three of its faces.

The cube is turned to look like this.

Draw and shade the missing shapes.

Total:
Measures

1. Convert the following measurements:
   i. \(0.67\text{kg} = \square\text{grams}\)
   ii. \(367\text{cm} = \square\text{metres}\)

2. In a supermarket, there are two brands of soap powder on offer:
   Brand A  2.1kg for £2.42
   Brand B  700g for 92p
   Which is the best buy? Show your working.

3. Solve the following problem:

   Lara has some money.
   She spent £1.25 on a drink.
   She spent £1.60 on a sandwich.
   She has three-quarters of her money left.
   How much money did Lara have to start with?
   Show your working below:
4. One face of a prism is made from 5 squares. Each square has side length 3cm.

5. The diagram shows a shaded triangle inside a rectangle.

What is the area of the shaded triangle?
1. This pie chart shows the lunch choices of year 6 children at a school.

28 children in year 6 have a **school meal**. How many **go home** for lunch?

2. People in a village were asked if they shop in the village, or the town, or in both. The bar chart shows the results.

Altogether 246 people took part in the survey. How many people shop in both the village and the town?
3. This is a graph of a firework rocket, showing its height at different times.

Estimate from the graph for how many seconds the rocket is **more than 20 metres** above the ground.

Estimate from the graph how many metres the rocket falls in the last **second** of its flight.

4. Here are four numbers. Their **mean** is 4 and their **range** is 0

   4  4  4  4

Write four numbers that have a **mean** of 4 and a **range** of 4

Total:
1. Find the value of \( t \) in this equation:

\[ 33 - 8t = 9 \]

2. Simplify the following expressions:

   i. \[ 2(w + 7) + 8 \]

   ii. \[ 3(w + 5) - (w + 9) \]

3. David makes a sequence of numbers. He chooses a starting number and then subtracts equal amounts each time.
   
The third number in his sequence is 45. The tenth number is –32
   
Write the first ten numbers in the sequence.
4. Here is a sequence of patterns made from octagons and squares.

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<tr>
<th>number of octagons (n)</th>
<th>number of squares (q)</th>
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<tr>
<td>1</td>
<td>4</td>
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<tr>
<td>2</td>
<td>7</td>
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<tr>
<td>3</td>
<td>10</td>
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<tr>
<td>4</td>
<td>13</td>
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The sequence continues.

How many squares will there be in the pattern that has 50 octagons?
Show your working.

$q$ represents the number of squares. $n$ represents the number of octagons.
What is the rule connecting $q$ and $n$?

Total:
Name:

Highest Award Achieved in Maths:

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<th>Strand of Mathematics</th>
<th>Areas for Development:</th>
<th>Total Mark &amp; % for</th>
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Results from initial maths audit of knowledge.
Keep a copy as you need to actively address weaker areas of knowledge.