Mathematics

Second Practice Test 1
Level 5-7
Calculator not allowed

Please read this page, but do not open your booklet until your teacher tells you to start. Write your name and the name of your school in the spaces below.

First name ________________________________
Last name ________________________________
School ____________________________________

Remember

• The test is 1 hour long.
• You must not use a calculator for any question in this test.
• You will need: pen, pencil, rubber and a ruler.
• Some formulae you might need are on page 2.
• This test starts with easier questions.
• Try to answer all the questions.
• Write all your answers and working on the test paper – do not use any rough paper. Marks may be awarded for working.
• Check your work carefully.
• Ask your teacher if you are not sure what to do.

For marker's use only
Total marks
Instructions

Answers
This means write down your answer or show your working and write down your answer.

Calculators
You must not use a calculator to answer any question in this test.

Formulae
You might need to use these formulae

Trapezium

\[ \text{Area} = \frac{1}{2} (a + b)h \]

Prism

\[ \text{Volume} = \text{area of cross-section} \times \text{length} \]
1. (a) Show that $9 \times 28$ is 252

(b) What is $27 \times 28$?

You can use part (a) to help you.
2. (a) I have a square piece of paper.

The diagram shows information about this square labelled A.

I fold square A in half to make rectangle B.

Then I fold rectangle B in half to make square C.

Complete the table below to show the area and perimeter of each shape.

<table>
<thead>
<tr>
<th></th>
<th>Area</th>
<th>Perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square A</td>
<td>cm²</td>
<td>cm</td>
</tr>
<tr>
<td>Rectangle B</td>
<td>cm²</td>
<td>cm</td>
</tr>
<tr>
<td>Square C</td>
<td>cm²</td>
<td>cm</td>
</tr>
</tbody>
</table>
(b) I start again with square A.

Then I fold it in half to make triangle D.

What is the area of triangle D?

What is the area of triangle D?

(c) One of the statements below is true for the perimeter of triangle D.

Tick (✓) the correct one.

The perimeter is less than 24 cm.

The perimeter is 24 cm.

The perimeter is greater than 24 cm.

Explain your answer.
3. A ruler costs $k$ pence.
A pen costs $m$ pence.

Match each statement with the correct expression for the amount in pence.
The first one is done for you.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>The total cost of 5 rulers</td>
<td>$5k$</td>
</tr>
<tr>
<td>The total cost of 5 rulers and 5 pens</td>
<td>$5m$</td>
</tr>
<tr>
<td>How much more 5 pens cost than 5 rulers</td>
<td>$5k + m$</td>
</tr>
<tr>
<td>The change from £5, in pence, when you buy 5 pens</td>
<td>$5m - 5k$</td>
</tr>
</tbody>
</table>
4. (a) Work out the missing values.

\[
\begin{align*}
10\% \text{ of } 84 &= \underline{\hspace{2cm}} \\
5\% \text{ of } 84 &= \underline{\hspace{2cm}} \\
2\frac{1}{2}\% \text{ of } 84 &= \underline{\hspace{2cm}}
\end{align*}
\]

2 marks

(b) The cost of a CD player is £84 plus 17\(\frac{1}{2}\)% tax.

What is the total cost of the CD player?

You can use part (a) to help you.

£

2 marks
5. Solve these equations.

\[2k + 3 = 11\]

\[k = \text{__________} \quad 1 \text{ mark}\]

\[2t + 3 = -11\]

\[t = \text{__________} \quad 1 \text{ mark}\]
6. (a) I am thinking of a number.
   My number is a **multiple of 4**

   Tick (✓) the true statement below.

<table>
<thead>
<tr>
<th>My number must be even</th>
<th>My number must be odd</th>
<th>My number could be odd or even</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

   Explain how you know.

(b) I am thinking of a **different** number.
   My number is a **factor of 20**

   Tick (✓) the true statement below.

<table>
<thead>
<tr>
<th>My number must be even</th>
<th>My number must be odd</th>
<th>My number could be odd or even</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

   Explain how you know.
7. Look at this sequence of patterns made with hexagons.

To find the number of hexagons in pattern number \( n \) you can use these rules:

\[
\begin{align*}
\text{Number of grey hexagons} & = n + 1 \\
\text{Number of white hexagons} & = 2n
\end{align*}
\]

**Altogether**, what is the total number of hexagons in pattern number 20?
8. The diagrams show nets for dice. Each dice has six faces, numbered 1 to 6.

Write the missing numbers so that the numbers on opposite faces add to 7.
9. (a) Put these values in order of size with the **smallest first**.

\[ 5^2 \quad 3^2 \quad 3^3 \quad 2^4 \]

(b) Look at this information.

\[ 5^5 \text{ is } 3125 \]

What is \(5^7\)?
10. Write the correct operations (+ or – or × or ÷) in these statements.

\[ a \quad \_ \quad a \quad = \quad 0 \]

\[ a \quad \_ \quad a \quad = \quad 1 \]

\[ a \quad \_ \quad a \quad = \quad 2a \]

\[ a \quad \_ \quad a \quad = \quad a^2 \]

11. Solve this equation.

\[ 3y + 14 = 5y + 1 \]

\[ y = \_ \]

2 marks
12. Hanif asked ten people:

‘What is your favourite sport?’

Here are his results.

<table>
<thead>
<tr>
<th>football</th>
<th>cricket</th>
<th>football</th>
<th>hockey</th>
<th>swimming</th>
</tr>
</thead>
<tbody>
<tr>
<td>hockey</td>
<td>swimming</td>
<td>football</td>
<td>netball</td>
<td>football</td>
</tr>
</tbody>
</table>

(a) Is it possible to work out the mean of these results?

☐ Yes  ☐ No

Explain how you know.

(b) Is it possible to work out the mode of these results?

☐ Yes  ☐ No

Explain how you know.
13. (a) Give an example to show the statement below is **not** correct.

When you multiply a number by 2, the answer is always greater than 2

(b) Now give an example to show the statement below is **not** correct.

When you subtract a number from 2, the answer is always less than 2

(c) Is the statement below correct for all numbers?

The square of a number is greater than the number itself.

Yes  No

Explain how you know.
14. The scatter graph shows 15 pupils’ coursework and test marks.

To find a pupil’s total mark, you add the coursework mark to the test mark.

(a) Which pupil had the highest total mark?

(b) Look at the statement below. Tick (✓) True or False.

The range of coursework marks was greater than the range of test marks.

[ ] True  [ ] False

Explain your answer.
(c) Pupils with total marks in the shaded region on the graph win a prize.

What is the **smallest total mark** needed to win a prize?

(d) Another school has a different rule for pupils to win a prize.

**Rule:** The coursework mark must be 25 or more, and the test mark must be 25 or more, and the total mark must be 65 or more.

On the graph below, shade the region of total marks for which pupils would win a prize.
15. Work out

\[ \frac{1}{4} + \frac{1}{3} = \]

\[ \frac{3}{5} - \frac{1}{15} = \]
16. Look at the triangle.

Work out the value of $a$

$$a = \text{__________}$$

3 marks
17. Write the missing numbers in these multiplication grids.

\( \begin{array}{cc}
  \times & 8 \\
 9 & 72 \\
-6 & 30 \\
\end{array} \)

\( \begin{array}{cc}
  \times & 0.2 \\
 3 & 1.2 \\
 & 6 \\
\end{array} \)
18. A teacher asked 21 pupils to estimate the height of a building in metres.

The stem-and-leaf diagram shows all 21 results.

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>represents 6.5m</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0</td>
<td>2  6  8  8</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>3  5  7  7  9</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>5  5  5</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

(a) Show that the **range** of estimated heights was **5.2 m**.

(b) What was the **median** estimated height?

(c) The height of the building was **9.2 m**.

What **percentage** of the pupils **over-estimated** the height?
19. In a quiz game two people each answer 100 questions. They score one point for each correct answer.

The quiz game has not yet finished.
Each person has answered 90 questions.

The table shows the results so far.

<table>
<thead>
<tr>
<th></th>
<th>Person A</th>
<th>Person B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60% of the first 90 questions correct</td>
<td>50% of the first 90 questions correct</td>
</tr>
</tbody>
</table>

Can person B win the quiz game?

Explain your answer.

Tick (✓) your answer.

- B can win.  
- B cannot win but can draw.  
- B cannot win or draw.
20. Solve these simultaneous equations using an algebraic method.

\[ 3x + 7y = 18 \]
\[ x + 2y = 5 \]

You must show your working.

\[ x = \quad \quad \quad \quad y = \quad \quad \quad \quad \]

3 marks
21. A pupil investigated whether students who study more watch less television.

The scatter graph shows his results. The line of best fit is also shown.

(a) What type of correlation does the graph show?

(b) The pupil says the equation of the line of best fit is $y = x + 40$

Explain how you can tell that this equation is **wrong**.
22. The diagram shows a square with side length 5 cm.

The length of the diagonal is $y$ cm.

Show that the value of $y$ is $\sqrt{50}$.
END OF TEST
END OF TEST