First Practice Test 2
Levels 5-7
Calculator allowed

First name

Last name

School

Remember

- The test is 1 hour long.
- You may use a calculator for any question in this test.
- You will need: pen, pencil, rubber, ruler, tracing paper (optional) and a scientific or graphic calculator.
- 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 may use a calculator to answer any question in this test.

Formulae
You might need to use these formulae

**Trapezium**

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

**Prism**

Volume = area of cross-section \( \times \) length
1. Look at the diagram of Megan’s cube.

Megan puts her finger on point A.
She can move her finger along 3 edges to get from point A to point H without taking it off the cube.

Complete the table below to show all 6 ways she can do this.
One way is done for you.

<table>
<thead>
<tr>
<th>Ways of moving from A to H</th>
</tr>
</thead>
<tbody>
<tr>
<td>A ➔ B ➔ C ➔ H</td>
</tr>
</tbody>
</table>
2. (a) A straight piece of model car track is 20cm in length.

How many of these straight pieces are needed to make a 1 metre track?

(b) A curved piece of track looks like this:

How many of these curved pieces are needed to make a complete circle of track?
3. Match each statement to the correct expression.

The first one is done for you.

- **Add 2 to \(a\)**
  - 2
  - 2

- **Subtract 2 from \(a\)**
  - \(a + 2\)
  - \(a - 2\)

- **Multiply \(a\) by 2**
  - 2\(a\)
  - \(a \cdot 2\)

- **Divide \(a\) by 2**
  - \(\frac{2}{a}\)
  - \(\frac{a}{2}\)

- **Multiply \(a\) by itself**
  - \(a^2\)
  - \(a \cdot a\)

2 marks
4. Look at the shapes drawn on the centimetre square grid.

For each one, work out the **area** that is **shaded**.

The first one is done for you.

\[
\text{Area} = \_12 \text{ cm}^2 \quad \text{Area} = \_\_\_ \text{ cm}^2 \quad \text{Area} = \_\_\_ \text{ cm}^2
\]

5. (a) Look at the equation.

\[ n + 3 = 12 \]

Use it to work out the value of \( n - 3 \)

(b) Now look at this equation.

\[ n + 3 = 7 \]

Use it to work out the value of \( n - 6 \)
6.  (a) Shade **two** more squares on the shape below so that it has 
*rotation symmetry* of order **4**

(b) Now shade **four** more squares on the shape below so that it has 
*rotation symmetry* of order **2**
7. Kim works in a shop.

The shaded squares on the diagram below show the hours she worked in one week.

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table shows her pay for each hour worked.

<table>
<thead>
<tr>
<th>Time</th>
<th>Pay for each hour worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday to Friday, 9am to 5pm</td>
<td>£6.35</td>
</tr>
<tr>
<td>Monday to Friday, after 5pm</td>
<td>£7.50</td>
</tr>
<tr>
<td>Saturday</td>
<td>£7.50</td>
</tr>
</tbody>
</table>
How much was Kim’s pay for this week?

£

2 marks

8. Here is some information about three people.

- Jo is 2 years older than Harry.
- Kate is twice as old as Jo.

Write an expression for each person’s age using $n$

The first one is given.

- Harry’s age $n$
- Jo’s age
- Kate’s age

1 mark

1 mark
9. A famous mathematician claimed that:

Every even number greater than 4 can be written as the sum of a pair of prime numbers.

For example: 8 can be written as the sum of 3 and 5, and 3 and 5 are both prime numbers.

(a) Write a pair of prime numbers that sum to 16

_____ and _____  

Now write a different pair of prime numbers that sum to 16

_____ and _____  

(b) Now choose an even number that is greater than 16, then write a pair of prime numbers that sum to your even number.

Complete the sentence below.

The even number _____ can be written as

the sum of the prime numbers _____ and _____  

1 mark
The diagrams show an **equilateral triangle** and a **square**.

The shapes are not drawn accurately.

The side length of the equilateral triangle is 8.4 cm.

The **perimeter** of the square is the **same** as the perimeter of the equilateral triangle.

Work out the **side length** of the square.
11. (a) Look at the equation.

\[ 5x + 1 = 2x - 8 \]

Complete the sentence below by ticking (✓) the correct box.

**The value of** \( x \) **is …**

- [ ] … one particular number.
- [ ] … any number less than zero.
- [ ] … any number greater than zero.
- [ ] … any whole number.
- [ ] … any number at all.

1 mark

(b) Now look at this equation.

\[ y = 3x - 2 \]

Complete the sentence below by ticking (✓) the correct box.

**The value of** \( x \) **is …**

- [ ] … one particular number.
- [ ] … any number less than zero.
- [ ] … any number greater than zero.
- [ ] … any whole number.
- [ ] … any number at all.

1 mark
12. Gita threw three darts.

Use the information in the box to work out what numbers she threw.

- The lowest number was 10
- The range was 10
- The mean was 15

Gita’s numbers were _____, _____ and _____

1 mark


<table>
<thead>
<tr>
<th>Mass in ounces</th>
<th>Mass in grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>4</td>
<td>110</td>
</tr>
<tr>
<td>5</td>
<td>150</td>
</tr>
<tr>
<td>10</td>
<td>275</td>
</tr>
</tbody>
</table>

Use the table to explain how you can tell the conversions cannot all be exact.

1 mark
14. Concorde could travel 1 mile every 3 seconds.

How many miles per hour (mph) is that?

\[ \text{mph} \]

\[ \text{__________ mph} \]

2 marks

15. In a bag, there are only red, white and yellow counters.

I am going to take a counter out of the bag at random.

The probability that it will be red is more than \(\frac{1}{4}\).

It is twice as likely to be white as red.

Give an example of how many counters of each colour there could be.

Write numbers in the sentence below.

\[ \text{There could be ______ red, ______ white and ______ yellow counters.} \]

2 marks
16. (a) The perimeter of a regular hexagon is $42a + 18$
Write an expression for the length of one of its sides.

(b) The perimeter of a different regular polygon is $75b - 20$
The length of one of its sides is $15b - 4$
How many sides does this regular polygon have?

(c) The perimeter of a square is $4(c - 9)$
Find the perimeter of the square when $c = 15$
17. A dessert has both fruit and yoghurt inside.

Altogether, the mass of the fruit and yoghurt is 175g.

The ratio of the mass of fruit to the mass of yoghurt is 2 : 5

What is the mass of the yoghurt?

___ g

2 marks

18. The diagram shows a plan of Luke’s new lawn.

The lawn is a circle with radius 3m.

Work out the area of the lawn.

___ m²

2 marks
19. To find the $n$th triangular number, you can use this rule.

\[
\text{n}th \text{ triangular number } = \frac{n(n + 1)}{2}
\]

Example: 3rd triangular number = \( \frac{3}{2}(3 + 1) \)

= 6

(a) Work out the 10th triangular number.

(b) Now work out the 100th triangular number.
20. (a) The graphs show information about the different journeys of four people.

Write the correct names next to the journey descriptions in the table below.

<table>
<thead>
<tr>
<th>Name</th>
<th>Journey description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ann</td>
<td>This person walked slowly and then ran at a constant speed.</td>
</tr>
<tr>
<td>Ben</td>
<td>This person walked at a constant speed but turned back for a while before continuing.</td>
</tr>
<tr>
<td>Chris</td>
<td>This person walked at a constant speed without stopping or turning back.</td>
</tr>
<tr>
<td>Dee</td>
<td>This person walked at a constant speed but stopped for a while in the middle.</td>
</tr>
</tbody>
</table>
(b) Ella made a different journey of 4km.

She walked to a place 4km away from her starting point.

Here is the description of her journey.

For the first 15 minutes she walked at 4km per hour.
For the next 15 minutes she walked at 2km per hour.
For the last 30 minutes she walked at a constant speed.

Show Ella’s journey accurately on the graph below.

(c) For the last 30 minutes of her journey, what was Ella’s speed?

\[ \text{km per hour} \]
21. Look at triangle ABC.

ABD is an isosceles triangle where AB = AD.

\[ \begin{align*}
    x &= \text{_______} \quad \text{because} \quad \text{__________________________} \\
    y &= \text{_______} \quad \text{because} \quad \text{__________________________} \\
    z &= \text{_______} \quad \text{because} \quad \text{__________________________}
\end{align*} \]

Work out the sizes of angles \( x \), \( y \) and \( z \)

Give reasons for your answers.
22. A shop has this special offer.

- Reduction of 10% when your bill is between £50 and £100
- Reduction of 20% when your bill is more than £100

Before the reductions, Marie’s bill is £96 and Richard’s bill is £108

After the reductions, who paid more?

You must show working to explain your answer.

Tick (✔) the correct answer.

- Marie
- Richard
- Both paid the same

2 marks
23. The scatter graph shows the maximum number of passengers plotted against the wingspans of some passenger planes.

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

(b) Draw a line of best fit on the scatter graph.

(c) Another passenger plane has a wingspan of 40m. The plane is full of passengers. If each passenger takes 20kg of bags onto the plane, estimate how much their bags would weigh altogether.

_______ kg
24. Kaylee has some 1cm cubes.
She makes a solid cube with side length 6cm out of the cubes.

Then she uses all these cubes to make some cubes with side length 2cm.
How many of these 2cm cubes can Kaylee make?
25. You can buy jars of the same jam in two sizes.

A

454g for £1.59

B

340g for £1.25

Which jar is better value for money?

You must show working to explain your answer.

Tick (✓) your answer.

☐ A  ☐ B

2 marks
26. Tom’s height is 1.8m.

He stands near a tree.

At 4pm, the length of Tom’s shadow is 2.7m.
At 4pm, the length of the tree’s shadow is 6.3m.

What is the height of the tree?
27. Here are the \( n \)th term expressions for three different sequences.

\[
\begin{align*}
\text{Sequence A:} & \quad 2^{(n - 1)} \\
\text{Sequence B:} & \quad \frac{n^2 - n + 2}{2} \\
\text{Sequence C:} & \quad \frac{n(n^2 - 3n + 8)}{6}
\end{align*}
\]

The first three terms of each sequence are 1, 2 and 4.

What is the 4th term of each sequence?

You **must** show your working.

Sequence A: ____________

Sequence B: ____________

Sequence C: ____________

3 marks
28. Look at this triangle. Work out length AC.

\[ AC = \underline{ \text{__________ cm} } \]  

[Diagram of a right-angled triangle with sides labeled 9 cm, 17 cm, and unknown AC.]  

Not drawn accurately  

2 marks
END OF TEST