Year 8 mathematics test

Paper 1

Calculator not allowed

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

First name ________________________________

Last name ________________________________

Class ____________________________________

Date _____________________________________

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, ruler, a pair of compasses and tracing paper (optional).
- 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 marking 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
Volume = area of cross-section × length
## 1. Complete these multiplication squares.

### Multiplication Square 1

<table>
<thead>
<tr>
<th>x</th>
<th>6</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Multiplication Square 2

<table>
<thead>
<tr>
<th>x</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>54</td>
</tr>
</tbody>
</table>

2 marks
The chart shows the cost of a winter holiday in Spain.

(a) What is the starting date of the most expensive holiday?

(b) Meg is booking a holiday with starting date 27th December. About how much more will a two week holiday cost than a one week holiday?
Amar packs two suitcases to take on a plane.

One suitcase weighs **12.56kg**
The other weighs **9.73kg**

Amar is only allowed to take **20kg** on the plane.
His suitcases are too heavy.

By how much are they too heavy?

\[
\text{kg}
\]
Here is some information about a play.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Starts at</td>
<td>7:30 pm</td>
</tr>
<tr>
<td>First act lasts</td>
<td>48 minutes</td>
</tr>
<tr>
<td>Interval lasts</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Second act lasts</td>
<td>47 minutes</td>
</tr>
</tbody>
</table>

At what time does the second act end?

............. pm  

2 marks
Here is part of the 87 times table.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1 \times 87 = 87$</td>
</tr>
<tr>
<td>2</td>
<td>$2 \times 87 = 174$</td>
</tr>
<tr>
<td>3</td>
<td>$3 \times 87 = 261$</td>
</tr>
<tr>
<td>4</td>
<td>$4 \times 87 = 348$</td>
</tr>
<tr>
<td>5</td>
<td>$5 \times 87 = 435$</td>
</tr>
<tr>
<td>6</td>
<td>$6 \times 87 = 522$</td>
</tr>
<tr>
<td>7</td>
<td>$7 \times 87 = 609$</td>
</tr>
<tr>
<td>8</td>
<td>$8 \times 87 = 696$</td>
</tr>
<tr>
<td>9</td>
<td>$9 \times 87 = 783$</td>
</tr>
<tr>
<td>10</td>
<td>$10 \times 87 = 870$</td>
</tr>
</tbody>
</table>

(a) The answer to $14 \times 87$ is 1218

You can use the table to work out this answer in different ways.

Fill in the gaps to complete two different ways.

First way:

$7 \times 87 = 609$, then multiply 609 by ............... 1 mark

Second way:

$10 \times 87 = 870$ and $4 \times 87 = 348$, then .................. 1 mark

(b) Work out $16 \times 87$

You can use the table to help you.
6 Write in the empty boxes what the missing numbers could be.

\[
\begin{align*}
\square \times \square - 10 & = 14 \\
\square \times 5 \times \square & = 50
\end{align*}
\]

'1 mark'

7 Here are some fraction cards.

\[
\frac{1}{3} \quad \frac{1}{3} \quad \frac{1}{3} \quad \frac{1}{3} \quad \frac{1}{3} \\
\frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4}
\]

Use five of these cards to make a total of \(1\frac{1}{2}\)

\[
\square + \square + \square + \square + \square = 1\frac{1}{2}
\]

'1 mark'
Look at the triangle ABC, drawn on a square grid.

Here are some statements about triangle ABC.

For each statement tick (✓) True or False.

The triangle is isosceles.

The triangle has only one line of symmetry.

The triangle is right-angled.

The coordinates of A are (2, 3)

True False

2 marks
9. Look at these number cards.

-7  -5  -3  -1  1  3  5  7

(a) Choose any two of the number cards that add to 2

\[ \square + \square = 2 \]

1 mark

(b) Choose any three of the number cards that add to –5

\[ \square + \square + \square = -5 \]

1 mark

(c) Choose any four of the number cards that add to 0

\[ \square + \square + \square + \square = 0 \]

1 mark
Dave and Steve are in a high jump competition.

Dave jumps $1\frac{1}{4}$ metres.

Steve jumps 1.4 metres.

Who jumps higher? Tick (✓) Dave or Steve.

Dave  Steve

How much higher does he jump?
Give your answer in metres.

[ ] metres

2 marks
Fill in the gaps to show what the units measure. The first one is done for you.

- **centimetres** measure \( \underline{\text{length}} \)
- **kilograms** measure \( \underline{\text{}} \)
- **litres** measure \( \underline{\text{}} \)
- **square metres** measure \( \underline{\text{}} \)

12 When \( n \) is 5, work out the value of \( 2(n + 1) \)
13 (a) Here are three numbers.

\[
\begin{array}{ccc}
4 & 8 & 9 \\
\end{array}
\]

Show that the mean of these three numbers is 7

1 mark

(b) The mean of three numbers is 5
One of these numbers is 2

What could the other numbers be?
Write them on the cards below.

\[
\begin{array}{ccc}
2 & & \\
\end{array}
\]

1 mark

What else could the numbers be?
Use different numbers from your answer above.
Write them on the cards below.

\[
\begin{array}{ccc}
2 & & \\
\end{array}
\]

1 mark
(a) Use a ruler and compasses to draw a triangle that has these side lengths:

5cm, 5cm, 8cm

(b) Sally says it is possible to draw a triangle with these side lengths:

5cm, 5cm, 12cm

Is she correct? Tick (✓) Yes or No.

Yes  No

Explain how you know.
A petrol station shows this information:

10 litres = 2.2 gallons

How many gallons is 50 litres?

\[ \text{...gallons} \]
Find the area

The diagram shows four identical white rectangles around a shaded square.

What is the area of the shaded square?
I think of a number.  
4% of my number is 42

(a) What is 40% of my number?

(b) What is my number?
Fractions and decimals

18 (a) Write the missing **decimal** so that each pair **adds to 1**

The first one is done for you.

<table>
<thead>
<tr>
<th>fraction</th>
<th>decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{4}$</td>
<td>0.75</td>
</tr>
</tbody>
</table>

1 mark

<table>
<thead>
<tr>
<th>fraction</th>
<th>decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{3}{10}$</td>
<td>$\quad$</td>
</tr>
</tbody>
</table>

1 mark

<table>
<thead>
<tr>
<th>fraction</th>
<th>decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{3}{5}$</td>
<td>$\quad$</td>
</tr>
</tbody>
</table>

1 mark

(b) Write the missing **fraction** so that the pair below **adds to 1**

Write the fraction as simply as possible.

<table>
<thead>
<tr>
<th>fraction</th>
<th>decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\quad$</td>
<td>0.72</td>
</tr>
</tbody>
</table>

2 marks
Here is a sequence of patterns made from hexagons and triangles.

The sequence of patterns continues.

(a) In pattern number 90, how many hexagons and how many triangles will there be?

(b) In which pattern will there be 100 triangles?
Tessellation

20 The diagram shows a kite drawn on a square grid.

Draw five more of these kites to show how they tessellate.
Use the expressions on cards P, Q, R, S and T to answer the questions below.

(a) When \(a = 3\), which card has the highest value?

(b) When \(a = -3\), which card has the highest value?

(c) Which card's value is never negative whatever the value of \(a\)?
22 Look at the information in the box.

\[
\frac{16}{80} = 20\%
\]

The information can help you work out other number facts.

Fill in the missing numbers below.

\[
\frac{32}{160} = \square \% \\
\frac{16}{40} = \square \% \\
\frac{\square}{80} = 60 \%
\]

"1 mark"
The graph shows square ABCD.

The equation of the straight line through C and D is \( x = 7 \)

(a) What is the equation of the straight line through B and C?

(b) What is the equation of the straight line through B and D?

"1 mark"
The pupils in a class recorded the length of time they took to do their maths homework.

The stem-and-leaf diagram shows the results, in minutes.

There are 25 pupils in the class.

```
1 | 8 9
2 | 1 2 3 3 6 6 6 6 7
3 | 0 2 3 5 8 9
4 | 0 2 4 5 5 7
5 | 0 4
```

(a) The shortest time was 18 minutes. What was the longest time?

(b) What length of time was the mode?
END OF TEST