Maths SATs paper 3: reasoning

|  |  |
| --- | --- |
| **First name** |   |
| **Middle name** |   |
| **Last name** |   |
| **Date of birth** | **Day**  | **Month**  | **Year**  |
| **School name** |   |

**Instructions**

You **must not** use a calculator to answer any questions in this test.

**Questions and answers**

You have **40 minutes** to complete this test.

Follow the instructions for each question.

Work as quickly and as carefully as you can.

If you need to do working out, you can use the space around the question.

**Some questions have a method box like this:**

**Show your method**

For these questions, you may get a mark for showing your method.

If you cannot do a question, **go onto the next one.**

You can come back to it later, if you have time.

If you finish before the end, **go back and check your work.**

**Marks**

The number under each line at the side of the page tells you the maximum number of marks for each question.

1. **What is the next integer after 4099?**

|  |
| --- |
|  |

**1 mark**

**2. Complete this table with the missing numbers.**

The first row has been done for you.

|  |  |
| --- | --- |
| **Number** | **1000 less** |
| 7,500 | 6,500 |
| 1,643 |  |
|  | 4,099 |
|  | 10, 078 |

**2 marks**

**3. Write two factors of 24 that are not factors of 36.**

|  |  |
| --- | --- |
|  |  |

**1 mark**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 7.56 | x |   | = | 7560 |

**4. Complete the statement**

**1 mark**

|  |  |  |
| --- | --- | --- |
| $$<$$ | $$>$$ | = |

**5. Look at these symbols**

Write one in each statement below to make it true.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 2 ¾ |  | 2.75 |
| b. | ¼ of 20 |  | 4 |
| c. | 23 |  | 32 |

**2 marks**

**6.** Rachel buys **four** tee-shirts at£3.20 each.

She pays with a £20 pound note.



What change does she get back?

|  |
| --- |
|  |

**2 marks**

**7.** These two identical triangles make a **parallelogram**.



Draw another identical triangle in each of the boxes below to make the given shape:

|  |  |  |
| --- | --- | --- |
| **rectangle** |  | A different **parallelogram** to the example above |
|  |  |  |
| bigger **triangle** |  | Different bigger **triangle** |

**4 marks**

**8.** Find the missing angles:

|  |  |
| --- | --- |
| a. | ? |
| b. | 63°? |

**2 marks**

**9.** Ric and his **three** friends buy a ticket for a football game. They each gave Ric a £5 note. He

 bought the tickets and received £3.20 in change.

|  |
| --- |
|  |

1. How many tickets does he buy?

**1 mark**

1. How much does one ticket cost?

|  |
| --- |
| £ |

**2 marks**

**10.** These cuboids are made up of small cubes.

Write how many small cubes there are in each cuboid or shape below.



Number of cubes 6

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| a. | Number of cubes  |  | b. | Number of cubes  |
|  |  |  |  |  |
| c. | Number of cubes  |  | d. | Number of cubes  |

**4 marks**

**11. This pie chart shows how a group of 32 pupils travel to school.**

Complete the following table.

The number who travelled by Metro is already filled in.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Travel** | **Metro** | **Service Bus** | **Car** | **Walk** |
| Number of Children | 16 |  |  |  |

**12. Fill in the first box to make the statement true.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | ÷ | 4 | + | 3 | = | 7 |

**1 mark**

**13.** This triangle has an **area** of 6cm2.

On the grids below, can you draw the following shapes with the same area?

a. a different triangle,

b. a rectangle, and

c. a parallelogram.



|  |  |  |
| --- | --- | --- |
| **different triangle** |  | **rectangle** |
|  |  |  |
| **parallelogram** |  |  |

**3 marks**

**14. Look at this bus timetable from Gateshead to Washington:**

|  |
| --- |
| **Bus Timetable:** Gateshead to Washington |
| **Gateshead** depart: | 17:45 | 18:30 | 19:30 | 20:45 | 21:30 |
| **Washington** arrive: | 18:30 | 19:15 | 20:15 | 21:30 | 22:15 |

a. A bus leaves **Gateshead** at 18:30.

What time does it arrive in **Washington**?

|  |
| --- |
|  |

**1 mark**

b. Rama lives in Washington. He needs to be back home for **9pm.**

What is the **latest** bus he can get from Gateshead?

|  |
| --- |
|  |

**1 mark**

c. Sita is **20 minutes** too late for the 19:30 bus from Gateshead.

She catches the next bus instead.

How long does she need to wait for the next bus?

|  |
| --- |
|  |

**1 mark**

**15.** In each part, put a tick (✔) by the statement which is **most likely** to be **true**.

|  |  |
| --- | --- |
| My bathroom **door** is **2mm** high |  |
| My bathroom **door** is **2cm** high |  |
| My bathroom **door** is **2m** high |  |

a.

**1 mark**

|  |  |
| --- | --- |
| The **kettle** in my kitchen holds **2.5 litres** of water |  |
| The **kettle** in my kitchen holds **25 litres** of water |  |
| The **kettle** in my kitchen holds **250 litres** of water |  |

b.

**1 mark**

|  |  |
| --- | --- |
| The **orange** in my bag weighs **10 grams** |  |
| The **orange** in my bag weighs **100 grams** |  |
| The **orange** in my bag weighs **1000 grams** |  |

c.

**1 mark**

**16.** Circle the number that is **half** of **99**.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 44.5 | 45.5 | 50% | 49.5 | 33 |

**1 mark**

**17.** The diagram below shows that the number six is **half-way** between the numbers two and ten.



a. What number is **half-way** between **-2** and **6**?

|  |
| --- |
|  |

**1 mark**

b. The number **seven** is half-way between the number **one** and another.

What is the other number?

|  |
| --- |
|  |

**1 mark**

**18.**

a.Shade $\frac{3}{5}$ of the diagram.



**1 mark**

b. What **percentage** of the diagram have you shaded?

|  |
| --- |
|  % |

**1 mark**

**19. The numbers 1, 2, 3 and 4 can be written as the following sums:**

eg. 3 **+** 2 **+** 1 **+** 4 = 10 and **(**3 **+** 2**)** **×** **(**1 **+** 4**)** = 25

Using the symbols: **+**, **-**, **×**, **÷**, and **( )**, make the following statements true.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| a. | 3 | 2 | 1 | 4 | = | 9 |
| b. | 3 | 2 | 1 | 4 | = | 3 |
| c. | 3 | 2 | 1 | 4 | = | 0 |

**3 marks**

**20.**

a. Aisha thinks of a number. She **doubles** it, then **subtracts five** and gets the answer 7.

What was the number she was thinking of?

|  |
| --- |
|  |

**1 mark**

b. Kias repeats the above process and gets the **same** answer as what he started with.

What was the number he started with?

|  |
| --- |
|  |

**1 mark**

**21.** Here is an example of a **2cm** **cube**.

Its volume is 8cm3.



How many of these **2cm cubes** could fit exactly into a cuboid with dimensions 20cm by 12cm by 8cm?



|  |
| --- |
|  cubes |

**2 marks**

**22. Complete the following statements**

|  |  |  |
| --- | --- | --- |
| a. 50% of £12 = | £  |  |
|  |  |  |
| b. 25% of  |  | = £7 |

**1 mark**

 **1 mark**

**23. A square has a perimeter of 24cm.**

Not drawn accurately

A rectangle has a perimeter of 16cm

Not drawn accurately

The rectangle is joined onto the square to make a **larger** rectangle.

Work out the **perimeter** of this larger rectangle.

|  |
| --- |
|  cm |

**2 marks**

***The end***

**Answers**

|  |  |  |  |
| --- | --- | --- | --- |
|  **Qu.** | **Requirement**  | **Mark** | **Additional Guidance** |
| **1.** | 4,100 | **1** | Note: 5,000 is popular error |
| **2.** |

|  |  |
| --- | --- |
| **Number** | **1000 less** |
| 7,500 | 6,500 |
| 1,643 | **643** |
| **5,099** | 4,099 |
| **11,078** | 10,078 |

 | **1****1** | Allow 1 mark if they get the first answer and any one of next two correct. |
| **3.** | 8 and 24  | **1** |  |
| **4.** | 7.56 x **1000** = 7560 | **1** |  |
| **5.** | =>< | **1****1****1** | ¼ of 20 = 523 = 8; 32 = 9 |
| **6.** | Cost of 4 = 4 x £3.20 = £12.80Change = £20 - £12.80 = **£7.20** | **1****1** |  |
| **7.** |  | **1****1****1****1** | Accept diagrams in reverse order for (c) and (d) |

|  |  |  |  |
| --- | --- | --- | --- |
| **8.** | a. 60°b. 63° | **2** | Allow 1 mark for each correct answer. |
| **9.** | a. 4 x £5 = £20b.Cost =£20 - £3.20= = £16.80Single cost = £16.80 ÷ 4  = **£4.20** | **1****1****1** | Look for arithmetic accuracyAlternative: for ONE person change = £3.20÷ 4 = £0.80[1]Cost = £5- £0.80 = **£4.20 [1]**  |
| **10.** | a. 8b. 12c. 18d. 8 | **1****1****1****1** | Allow correct answers only |
| **11.** | Metro = 16Special Bus = **8** Car = **4** Walk = **4** | **1****1** | Allow any two correct for 1 mark |
| **12.** | 16 | **1** |  |
| **13.** |   | **1****1** | 6 by 2 or 2 by 6 (rotation)3 by 2 or 6 by 1 |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **1** | Equivalent to (b) Eg. base = 3;Perpendicular height = 2 |
| **14.** | a. 19:15b.19:30c. 55 minutes | **1****1****1** |  |
| **15.** | a. 2mb. 2.5 litresc. 100 grams | **1****1****1** |  |
| **16.** | 49.5 | **1** | Accept 49½ written |
| **17.** | a. 2b. 13 | **1****1** |  |
| **18.** | 1. shade in any **6** squares
2. 60%
 | **1****1** | Allow ½ as along as they add to 6. |
| **19.** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 3 | **x** | 2 | **-** | 1 | **+** | 4 | = | 9 |  |
| b. | 3 | **x** | 2 | **+** | 1 | $$-$$ | 4 | = | 3 |  |
| c. | **(** | 3 | $$-$$ | 2 | $$-$$ | 1 | **)** | **x** | 4 | =0 |

 | **1****1****1** | 1. Allow brackets (1 - 4)
2. Allow ÷ 4 instead of × 4
 |
| **20.** | 1. Aisha = 6
2. Kias = 5
 | **1****1** |  |
| **21.** | Volume of cuboid = 1920cm3Number of cubes = 1920 ÷ 8 = **240** | **1****1** | Alternative: find how many cubes fit each lengtheg. 20 ÷ 2 = 10; **[1]**Tot = 10 × 6 ×4 = **240** **[1]** |

|  |  |  |  |
| --- | --- | --- | --- |
| **22.** | 1. £6
2. £28
 | **1****1** |  |
| **23.** | Length of side of square = 6cmPossible dimensions of rectangle4 by 4; 5 by 3; 6 by 2; 7 by 1New length = 6 + 2 = 8cmPerimeter = (8) + 6 + (8) + 6 = **28cm** | **1****1** | Accept any rectangle with a perimeter of 16cmMust use correct rectangleOnly follow their rectangle for this final mark provided it has a perimeter =16cm |
| Total = **50 marks** |