# Key Stage 2 SATs

## Mathematics Practice Test and Mark Scheme

## Paper 2: Reasoning

Pack 2: 2017 (new curriculum)

| First name | |
|---|---|
| Last name | |
| Class | |
| Score | / 35 |

## Instructions

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

### Questions and answers

- 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.
- Do not write over any barcodes.
- **Some questions have a method box like this**:

- For these questions, you may get a mark for showing your method.
- If you cannot do a question, **go on to 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** Small boxes of chocolates contain 9 chocolates. How many boxes can be made from 630 chocolates?

**1 mark**

**2** Circle the calculation that gives the best approximation for **3.4 x 12.7**

34 x 127

3 x 12

3 x 13

3.5 x 12.5

**1 mark**

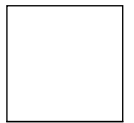**3** Circle the **largest** amount in each pair

80cm   –   1m

7.5kg   –   7005g

13mm   –   0.13cm

450g   –   4.05kg

2m   –   200mm

**2 marks**

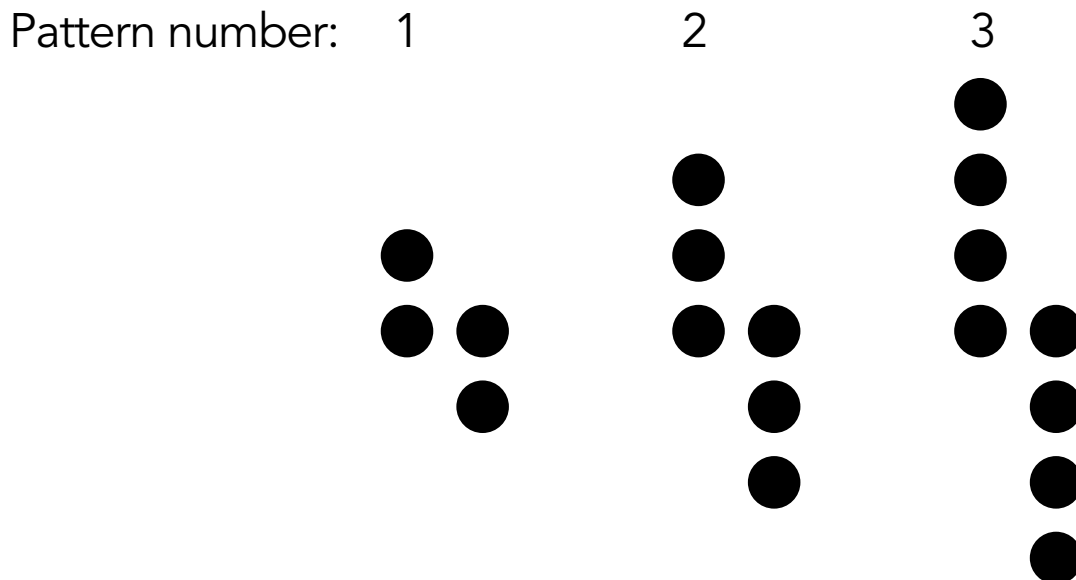**4** Write **T** or **F** in each box to indicate whether the statements given are true or false.

$\dfrac{1}{2} = 50\%$

$0.4 = \dfrac{2}{5}$

$\dfrac{10}{80} = 25\%$

**1 mark**

**5** A sequence is made using counters:

Pattern number:     1               2               3



How many counters are needed to make the 6th pattern in the sequence?

<table><tr><td><br><br><br></td><td></td></tr></table>

**1 mark**

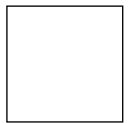Write a formula for the number of counters (c) needed to make the $n$th pattern in the sequence.

<table><tr><td>c =</td><td></td></tr></table>

**1 mark**

**6** The population of London in 2016 was 8.63 million. This is marked on the scale:
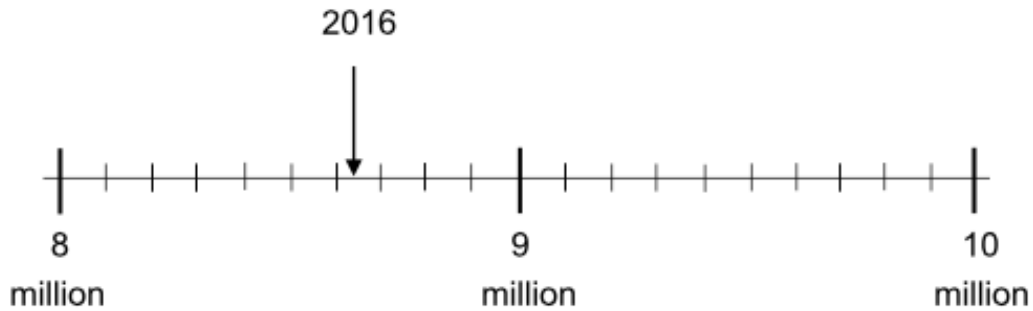


By 2025 the population of London is predicted to be 9.81 million. Draw an arrow to show the 2025 population on the scale above.

**1 mark**

**7** Name these 3D shapes:

**1 mark**

**1 mark**

**8**

$$\frac{1}{4} \quad \times \quad \frac{1}{2} \quad = \quad \boxed{\phantom{--}}$$

1 mark

$$\frac{1}{6} \quad \div \quad 2 \quad = \quad \boxed{\phantom{--}}$$

1 mark

9    This table shows the vehicles seen by Class 6R when they did a traffic survey:

|            | Monday | Tuesday | Wednesday | Thursday | Friday |
|------------|--------|---------|-----------|----------|--------|
| Cars       | 32     | 27      | 38        | 44       | 41     |
| Buses      | 2      | 1       | 3         | 3        | 4      |
| Vans       | 5      | 2       | 4         | 4        | 4      |
| Motorbikes | 2      | 5       | 3         | 2        | 3      |

On which day were the **most** vehicles counted?

1 mark

Calculate the **mean** number of motorbikes seen.

1 mark

**10** 1cm³ blocks have been used to make these shapes:
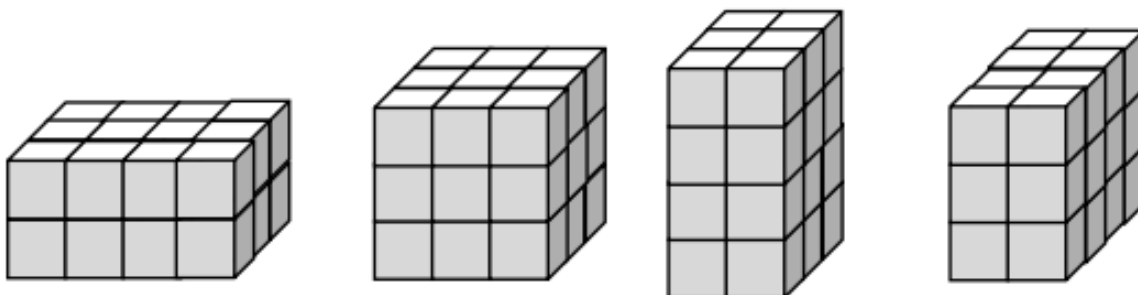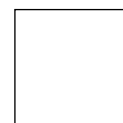


*(not to scale)*

Tick (√) the shape that has the largest volume.

1 mark

What is the length of one edge of a cube that has a volume of 64cm³?
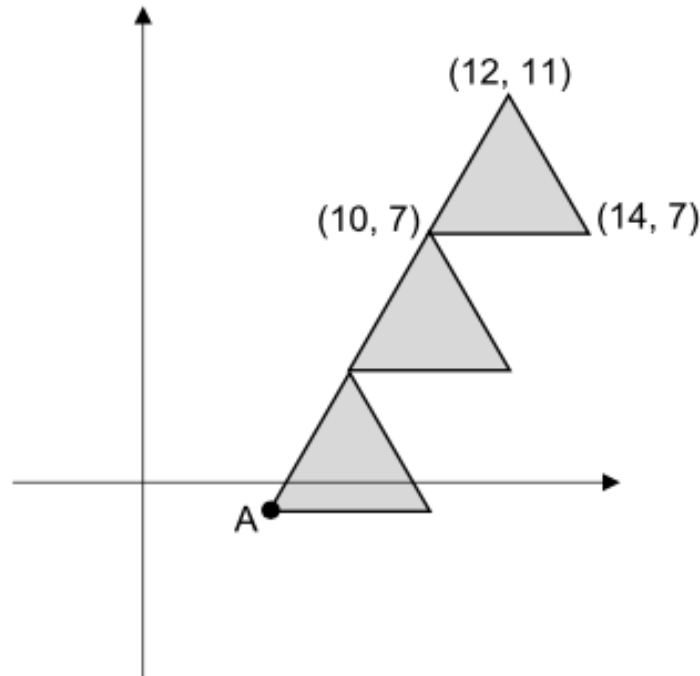
cm

1 mark

**11** Use 4 **different** digits to complete this multiplication calculation:

☐ x ☐ x ☐ x ☐ = 168

☐

**1 mark**

**12** Three **identical** triangles have been drawn on a co-ordinate grid:



The co-ordinates of the vertices of one triangle have been given.

What are the co-ordinates of vertex A?

(       ,       )

1 mark

If these three triangles were drawn on 1cm squared paper what would the area of one triangle be?

cm²

1 mark

**13** Round the numbers to nearest 100. Circle the **two** numbers that round to 1800

<div style="text-align:center">
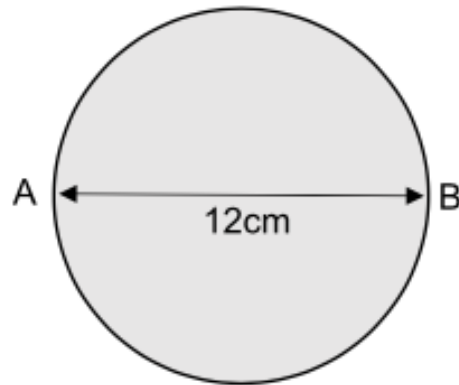
1089      1894      1846      1732      1765

</div>

**1 mark**

**14**

$$\boxed{\phantom{xxxxxxxx}} - 9.8 = 46.3$$

1 mark

$$50 \div \boxed{\phantom{xxxxxxxx}} = 1.25 \times 2$$

1 mark

**15** 3 feet is approximately 1 metre.
1 mile is approximately 1.6 kilometres.
Kate and Kenny each ran for 15 minutes.
Kenny ran 12,000 feet and Kate ran 2 miles.

How much further in kilometres did Kenny run than Kate? Show your method.

km

**2 marks**

**16** This is a recipe that makes 30 chocolate chip cookies:

- 150g butter
- 160g sugar
- 225g plain flour
- 1 large egg
- ½ teaspoon bicarbonate of soda
- 200g chocolate chips

Miss Watson wants to make **25** cookies for her class.

How much **plain flour** will she need?

Show your method.

**2 marks**

**17**

250ml  250ml  250ml  250ml

1 litre

*(not to scale)*

4 x 250ml
£1.05

1 x 1 litre
65p

Mr Raman needs **5 litres** of lemonade.

How much money does he save by buying five 1 litre bottles instead of packs of 250ml bottles?

Show your method.

**2 marks**

**18** This circle has a diameter of 12cm:



Complete these sentences:

The circle has a **radius** of [          ] cm [  ]

1 mark

The distance around the circle from A to B is 18.85cm.
What length is the **circumference**?

[          ] cm [  ]

1 mark

**19**  One square on this multiplication grid has been shaded. Shade any other squares that contain the same answer as this one.

| x | 2 | 4 | 8 | 3 |
|---|---|---|---|---|
| 3 | | | | |
| 2 | | | | |
| 12 | | | | |
| 7 | | | | |
| 6 | | | | |
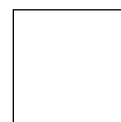
**1 mark**

**20** Sara says, 'There are 86,400 seconds in 1 day.'
Rani says, 'There are 24,000 seconds in 1 day.'

**Explain** how you know Sara is correct.
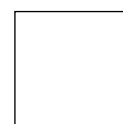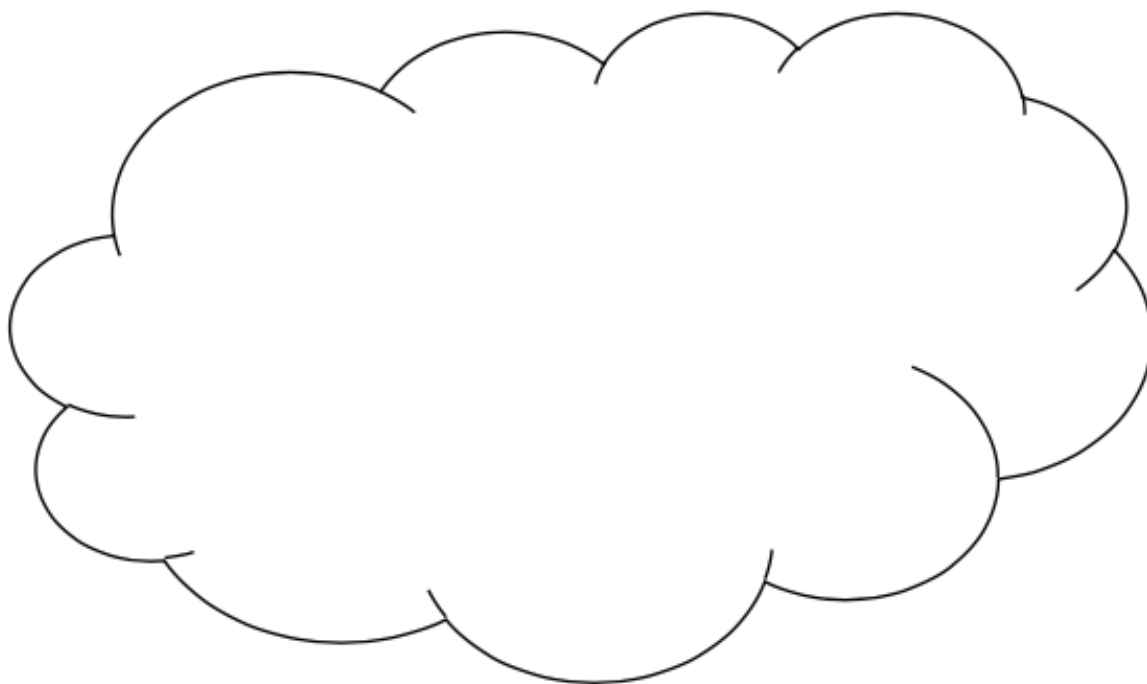
**1 mark**

**21** Harry, John and James jumped a total of 33m in a long jump competition.

Harry jumped 2.5 metres further than John.
James jumped 1 metre further than Harry.
How far did James jump?
Show your method.

**3 marks**

The instructions and principles of this mark scheme closely follow the guidance in the 2016 national curriculum tests. We have deliberately not set a limited time for the test paper as a teacher may want to very it according to the standard individual children are working at.

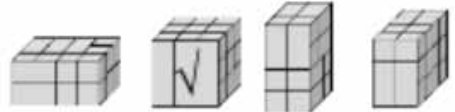The national curriculum test allows 40 minutes to complete this test.

**Demand Descriptors**
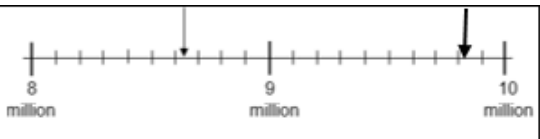
T  = Working towards expected standard
E  = Working at expected standard
G = Working at greater depth within expected standard

| Q | Required answer | Mark | Acceptable answer or additional guidance | Content Domain Ref | NC strand | Level of demand |
|---|---|---|---|---|---|---|
| 1 | 70 | 1m | | 4N1 | Number | T |
| 2 | 3 x 13 circled | 1m | | 6C3 | Calculation | E |
| 3 | Award TWO marks for all 5 correct:<br><br>80cm (1m)<br>(7.5kg) 7005g<br>(13mm) 0.13cm<br>450g (4.05kg)<br>(2m) 200mm<br><br>Award ONE mark for 3 or 4 correct answers. | Up to 2m | Accept any clear indication of the correct answers. | 3M1a<br>3M1b | Measures | E<br><br>E |
| 4 | T<br>T<br>F | 1m | Accept any clear indication of true/ false. | 5F12 | Fractions | E |
| 5 | 14<br>c = 2n + 2 | 1m | Accept 4n –2(n-1) | 6A3<br>6A3 | Algebra | E<br>E |

| Q | Required answer | Mark | Acceptable answer or additional guidance | Content Domain Ref | NC strand | Level of demand |
|---|---|---|---|---|---|---|
| 6 |  | 1m | Allow for slight inaccuracies | 4C6a | 6N3 | E |
| 7 | Cuboid | 1m | | 5G3b | Geometry | T |
| | Cylinder | | | 5G3b | | T |
| 8 | $\dfrac{1}{8}$   $\dfrac{1}{12}$ | 1m | | 6F5a | Fractions | E |
| | | 1m | | 6F5b | | E |
| 9 | Thursday | 1m | | 5S1 | Statistics | T |
| | 3 | 1m | | 6S3 | | E |
| 10 |   4cm | 1m | Accept any clear indication of the correct answer. | 6M8a | Measures | E |
| | | 1m | | 6M8a | | G |

| Q | Required answer | Mark | Acceptable answer or additional guidance | Content Domain Ref | NC strand | Level of demand |
|---|---|---|---|---|---|---|
| 11 | 2 x 3 x 4 x 7 OR 1 x 3 x 7 x 8 OR 1 x 4 x 6 x 7 | 1m | Digits can be in any order. | 6C5a | Calculation | G |
| 12 | (6,-1) 8cm² | 1m 1m | | 6P3 6M7b | Geometry | G G |
| 13 | 1846 AND 1765 | 1m | Both answers required. | 4N4b | Number | E |
| 14 | 56.1 20 | 1m 1m | | 5F10 5F10 | Fractions | E G |
| 15 | Award TWO marks for the correct answer of 0.8km<br><br>If the answer is incorrect, award ONE mark for evidence of an appropriate method with no more than one arithmetic error, e.g.<br><br>Kenny: 12,000 ÷ 3 = 4000m = 4km<br>Kate: 2 x 1.6 = 3.2km<br>4km -3.2km = | Up to 2m | Award 1m for either 4000m/4km or 3.2km as evidence of correct conversion | 6M6 | Measures | E G |

| Q | Required answer | Mark | Acceptable answer or additional guidance | Content Domain Ref | NC strand | Level of demand |
|---|---|---|---|---|---|---|
| 16 | Award TWO marks for the correct answer of 187.5g<br><br>If the answer is incorrect, award ONE mark for evidence of an appropriate method with no more than one arithmetic error, e.g.<br><br>225g ÷ 6 = 37.5g<br>37.5g x 5 =<br><br>OR<br><br>225 ÷ 30 = 7.5g<br>7.5g x 25 = | Up to 2m | Also accept 0.1875kg | 6R1 | Ratio and Proportion | E<br>E |
| 17 | If the answer is incorrect, award ONE mark for evidence of an appropriate method with no more than one arithmetic error, e.g.<br><br>£1.05 x 5 = £5.25<br>£0.65 x 5 = £3.25<br>Amount saved = £2.00 | Up to 2m | | 5M9a | Measures | E<br>E |

| Q | Required answer | Mark | Acceptable answer or additional guidance | Content Domain Ref | NC strand | Level of demand |
|---|---|---|---|---|---|---|
| 18 | 6cm | 1m | | 6G5 | Geometry | E |
| | 37.7cm | 1m | | 6G55 | | E |
| 19 |  | 1m<br><br>1m | Both answers required for the award of ONE mark.<br><br>Do not award the mark if other squares are shaded. | 4C6a | Calculation | T |
| 20 | Award ONE mark for an explanation that shows that:<br>There are 60 x 60 = 3600 seconds in 1 hour.<br>There are 24 hours in 1 day.<br>24 x 3600 = 86,400 seconds | | Do not accept vague, incomplete or incorrect explanations. | 5M4 | Measures | E |

| Q | Required answer | Mark | Acceptable answer or additional guidance | Content Domain Ref | NC strand | Level of demand |
|---|---|---|---|---|---|---|
| 21 | Award THREE marks for the correct answer of 12.5m. If the answer is incorrect award TWO mark for evidence of an appropriate method e.g.<br><br>John = xm<br>Harry = x + 2.5m<br>James = x + 2.5m + 1m<br>33m = x + (x+2.5) + (x+2.5+1)<br>33m = 3x + 6<br>33m – 6 = 3x<br>27 = 3x<br>9 = x = John's jump<br>So James = 9 + 3.5 = 12.5m | Up to 2m | Accept for ONE mark evidence of correct use of algebra, e.g:<br><br>John = xm<br>Harry = x + 2.5m<br>James = x + 2.5m + 1m<br>OR<br>Accept for one mark a sensible trial and improvement method giving an incorrect answer. | 5F10 | Fractions | E<br>G<br>G |

## Balance of difficulty of questions in the paper

5 marks at working towards
22 marks at the expected standard
8 marks at working at greater depth

## Thresholds

Working towards the expected standard: Criteria for 'working at the expected standard' have not been met.

Working at the expected standard: at least 11 of the 22 'expected' marks are obtained, together with all 5 of the working towards marks, but none of the 8 marks graded 'greater depth'. This mark is 16 out of 35.

Working at greater depth: all of the 5 working toward marks are obtained, plus at least 90% of the 'expected' marks and at least 50% of the 'greater depth' marks. This mark is 29 out of 35.

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