UK Maths Trust

Junior Mathematical Challenge

Thursday 1 May 2025

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England & Wales: Year 8 or below | *Scotland: S2 or below* | *Northern Ireland: Year 9 or below*

Instructions

1. Do not open the paper until the invigilator tells you to do so.

2. Time allowed: **60 minutes**. No answers, or personal details, may be entered after the allowed time is over.

3. The use of blank paper for rough working is allowed; **squared paper, calculators and measuring instruments are forbidden**.

4. **Use a B or an HB non-propelling pencil**. Mark at most one of the options, A, B, C, D, or E, on the Answer Sheet for each question. Do not mark more than one option.

5. **Do not expect to finish the whole paper in the time allowed**. The questions in this paper have been arranged in approximate order of difficulty with the harder questions towards the end. You are not expected to complete all the questions during the time. You should bear this in mind when deciding which questions to tackle.

6. **Scoring rules**:
   5 marks are awarded for each correct answer to Questions 1-15;
   6 marks are awarded for each correct answer to Questions 16-25.
   There is no penalty for giving an incorrect answer.

7. **Your Answer Sheet will be read by a machine**. Do not write or doodle on the sheet except to mark your chosen options. The machine will read all markings even if they are in the wrong places. If you mark the sheet in the wrong place, doodle, or leave bits of eraser stuck to the page, the machine will interpret the mark in its own way.

8. **The questions on this paper are designed to challenge you to think, not to guess**. You will gain more marks, and more satisfaction, by doing one question carefully than by guessing lots of answers. This paper is about solving interesting problems, not about lucky guessing.

9. To accommodate candidates sitting at other times, please do not discuss the paper on the internet until **08:00 BST on Saturday 3rd May**, when the solutions video will be released at ukmt.org.uk/competition-papers. Candidates in time zones more than 5 hours ahead of GMT must sit the paper on Friday 2nd May (as defined locally).

Enquiries about the Junior Mathematical Challenge should be sent to:

challenges@ukmt.org.uk   *www.ukmt.org.uk*

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1. What is $\frac{1}{2}$ of 10% of 20 ?

    A 1   B 2   C 5   D 10   E 20

2. What is the value of $\dfrac{4444 + 5555}{1111 + 2222}$?

    A 3   B 6.5   C 33   D 333   E 3333

3. How many of the following are factors of 2025?

| 15	25	45	75	225

    A 1   B 2   C 3   D 4   E 5

4. In March 2024, the British runner, Jasmin Paris, became the first woman ever to finish the 100-mile 'Barkley Marathons' in Tennessee. Her finishing time of 59 hours, 58 minutes and 21 seconds meant that she narrowly beat the cut-off time of 60 hours for the event. By how many seconds did Jasmin beat this cut-off time?

    A 99   B 109   C 119   D 129   E 139

5. The diagram shows the square $PQRS$ and the equilateral triangle PTS. What is the size of the angle RPT?

    A 10°   B 12°   C 15°   D $22\frac{1}{2}^{\circ}$ E 30°
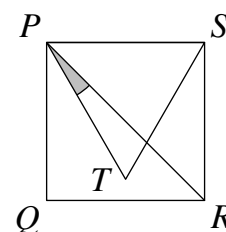
6. Carol and Sandra swim at their local 25 m pool. Sandra always swims 4 lengths in the same amount of time as Carol swims 3 lengths. One Monday morning, Carol swims 36 lengths. How far would Sandra swim in the same time?

    A 600 m   B 675 m   C 900 m   D 1200 m   E 1350 m

7. What is the difference between the smallest four-digit multiple of 3 and the largest three-digit multiple of 4?

    A 3   B 4   C 5   D 6   E 7

8. The country which, on average, eats the most chocolate per person is Switzerland, with the average person consuming 8.8 kg each year. How many 100 g chocolate bars would this be?

    A 8.8   B 88   C 880   D 8800   E 88 000

9. All four digits of 2 two-digit numbers are different. What is the smallest possible sum of the two numbers?

    A 30   B 33   C 37   D 40   E 42

10. The length of a turtle is 60 cm plus a third of its length. How long is the turtle?

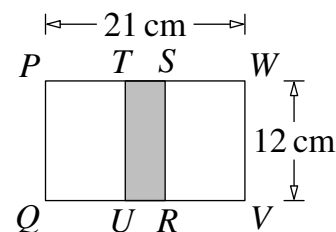   A 70 cm   B 75 cm   C 85 cm   D 90 cm   E 120 cm

11. Three consecutive one-digit positive integers are a square, a cube and a prime (not necessarily in that order). What is the product of the three integers?

    A 0   B 6   C 60   D 210   E 504

12. Two identical squares, *PQRS* and *TUVW*, overlap to form the 21 cm by 12 cm rectangle *PQVW* shown.
What is the area, in cm^2, of the shaded rectangle *TURS* ?

    A 24   B 36   C 48   D 72   E 96

13. In a sequence of rectangles, the first has height 10 cm and width 13 cm. Each of the following rectangles is 2 cm higher and 1 cm wider than the previous rectangle in the sequence.
How many rectangles in this sequence are also squares?

    A 0   B 1   C 2   D 4
    E an infinite number

14. Which of these is equal to $3^3 + 4^3 + 5^3$?

    A 6^3 B 8^3 C 10^3 D 12^3 E 12^9

15. Gill has had a baby girl! Weighing the baby at the clinic was not as much of a problem as when Gill was small, but the only available scales measured in imperial units. Baby weighed 8 pounds 13 ounces. Given that there are 16 ounces in a pound and 1 ounce is equivalent to approximately 28.35 grams, what was the approximate weight, in kilograms, of Gill's baby ?

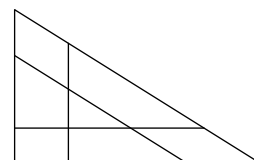   A 3 kg   B 4 kg   C 5 kg   D 6 kg   E 7 kg

16. What is the sum of 20% of 40% of 60 and 40% of 60% of 80?

    A 20   B 20.4   C 24   D 24.4   E 28

17. The diagram shows three pairs of parallel line segments.
Altogether, how many triangles are there in the diagram?

    A 4   B 6   C 8   D 10   E 12

18. A particular number has exactly nine factors, including 1 and itself.
The number has 9 and 12 as factors. What is the number?

    A 24   B 36   C 48   D 72   E 144

19. Ibraheem has 10 cards. Four display the letter P; three display Q; two display R and one displays S. He also has 10 counters. One shows the number 3; two show 1; three show 4 and four show 2. He places one counter on the top of each card so that every pairing is different. Which one of these pairings does he *not* make?
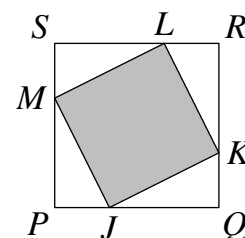
    A P2   B R4   C Q1   D R2   E S4

20. P, Q, R and S are four points in that order on a straight line; $PR = 6$ cm, $QS = 4$ cm and R is 1 cm nearer to S than it is to Q. What is the length of PS?

    A 7 cm   B 7.5 cm   C 8 cm   D 8.5 cm   E 9 cm

21. In the diagram, $PQRS$ and $JKLM$ are squares. Each corner of $JKLM$ is one third of the way along an edge of $PQRS$. What is the ratio of the area of $JKLM$ to the area of $PQRS$?

    A $1:2$ B $5:9$ C $3:5$ D $4:7$ E $3:4$

22. Idil has 12 bags of sweets. Some bags contain 3 mints, 4 toffees and a fudge; some bags contain 4 mints, 5 toffees and 2 fudges; the remaining bags contain 6 mints and 3 fudges. The bags contain 31 toffees in total. In total, how many fudges do the bags contain?

    A 22   B 23   C 24   D 25   E 26

23. The map in the diagram shows three towns and the roads between them. The length of the road between any two towns is a whole number of kilometres. The route from P to R via Q is twice as long as the direct route from P to R. The route from P to Q via R is three times as long as the direct route from P to Q. Which of the following could be the length of the route from P back to P via Q and R?
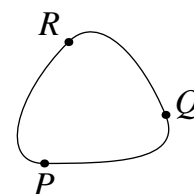
    A 74 km   B 81 km   C 95 km   D 108 km   E 124 km

24. When 180 is divided by a positive integer N, the remainder is 5. For how many values of N is this true?

    A 4   B 5   C 6   D 7   E 8

25. Given a cube, how many equilateral triangles are there whose vertices are three vertices of the cube?

    A 1   B 3   C 6   D 8   E 24