UK Maths Trust

Intermediate Mathematical Challenge

Wednesday 28 January 2026

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England & Wales: Year 11 or below | *Scotland: S4 or below* | *Northern Ireland: Year 12 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 or lined 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, 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;
   Each incorrect answer to Questions 16-20 loses 1 mark;
   Each incorrect answer to Questions 21-25 loses 2 marks.
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 black pencil markings even if they are in the wrong places. If you mark the sheet in the wrong place, 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 Friday 30th January**. Candidates in time zones more than 2 hours ahead of GMT must sit the paper on Thursday 29th January (as defined locally).

Enquiries about the Intermediate Mathematical Challenge should be sent to:

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

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1. Which of these has the largest value?

A $\dfrac{1+2}{2}$ B $\dfrac{1+2+3}{3}$ C $\dfrac{1+2+3+4}{4}$ D $\dfrac{1+2+3+4+5}{5}$
E $\dfrac{1+2+3+4+5+6}{6}$

2. What time will it be 2026 minutes after 20:26 on Monday?

A 06:12 on Tuesday B 16:12 on Tuesday C 20:12 on Tuesday
D 06:12 on Wednesday E 20:12 on Wednesday

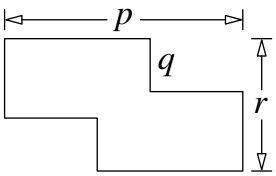
3. A cuboid has side-lengths, in cm, which are three consecutive positive integers. It has volume 120 cm^3. What is the area, in cm^2, of its largest face?

A 15 B 20 C 24 D 30 E 41

4. When 35 is shared in the ratio $1 : \frac{1}{2} : \frac{1}{4}$, what is the smallest part?

A 4 B $4\frac{1}{4}$ C $4\frac{1}{2}$ D $4\frac{3}{4}$ E 5

5. The diagram shows an octagon which is formed by two overlapping rectangles. Which of the following is a correct expression for the perimeter of the octagon?



A $2p + 2r$ B $2p + 2q$ C $2q + 2r$
D $2p - 2q + 2r$ E $2p + 2q - 2r$

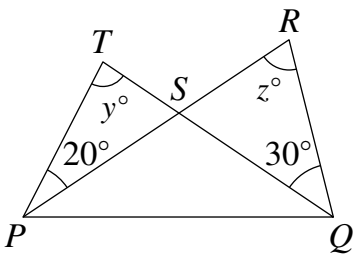
6. The nth term of a sequence is $\dfrac{n}{n+1}$. What is the first term of the sequence whose value is greater than 0.92?

A $\frac{9}{10}$ B $\frac{10}{11}$ C $\frac{11}{12}$ D $\frac{12}{13}$ E $\frac{13}{14}$

7. The five numbers 95, 96, 97, 98, 99 are each paired with one of the five numbers 1, 3, 5, 7, 9 (each number used once). The larger number of each pair is then divided by the smaller, giving five integer answers.
What is the difference between the smallest and the largest of the five integer answers?

A 96 B 86 C 76 D 66 E 56

8. The diagram shows two triangles PQT and PQR with QT and PR meeting at S. Angle TPR is 20° and angle TQR is 30°.
Angle STP is $y°$ and angle QRS is $z°$.
What is the relationship between y and z?



A $y = z + 10$ B $y = \dfrac{3z}{2}$ C $y = z$ D $y = z - 10$ E $y = \dfrac{2z}{3}$

9. How many of the following expressions are divisible by 24?

$5^2 - 1$	$7^2 - 1$	$9^2 - 1$	$11^2 - 1$	$13^2 - 1$

A 1 B 2 C 3 D 4 E 5

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10. A triangle has sides in the ratio 5 : 5 : 6 and area 108 cm^2.
What is the length, in cm, of the longest side of the triangle?

A 15 B 18 C 21 D 24 E 27

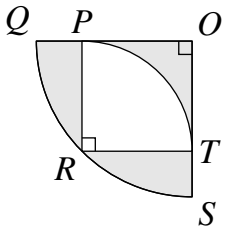
11. In the addition shown, the digits C, I, K, M, T and U represent different digits.

$$\begin{array}{cccc} U & K & M & T \\ + & I & M & C \\ \hline 2 & 0 & 2 & 6 \end{array}$$

What is the value of $T + I + C + K$?

A 6 B 15 C 16 D 25
E More information needed

12. Quarter circle PRT is removed from quarter circle OQS to leave three shaded regions, as shown. $OPRT$ is a square and $OP = 2x$.
What is the total area of the three shaded regions?



A $\frac{3x^2}{4}$ B x^2 C $2x^2$ D $\frac{3\pi x^2}{4}$ E πx^2

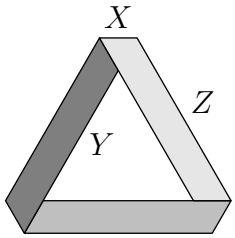
13. Noah writes down the numbers 1, 2, 4 and 13. He then adds a fifth integer x which then becomes the mean, median or mode of the five numbers. How many possible choices for x are there?

A 2 B 3 C 4 D 5 E 6

14. PQR is an acute-angled triangle. Each of its angles, in degrees, is a triangular number.
What is the smallest angle in the triangle?

A 21° B 28° C 36° D 45° E 55°

15. The diagram shows the UKMT logo, which is comprised of three identical parallelograms enclosing an equilateral triangle of side length Y. The ratio of the lengths $X : Y : Z$ is 1 : 4 : 5.
What is the ratio of the area of the enclosed triangle to the total area of the parallelograms?



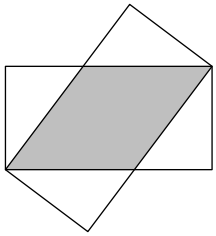
A 1 : 2 B 3 : 5 C 5 : 9 D 8 : 15 E 1 : 1

16. Kerry and Karen are driving to meet each other. They both leave home at mid-day and both drive at the same constant speed. At 1 pm they are 200 km apart by road. At 2:15 pm they are 100 km apart.
How far apart by road do Karen and Kerry live?

A 360 km B 320 km C 280 km D 260 km E 240 km

17. Two identical 1×2 rectangles overlap as in the figure on the right.

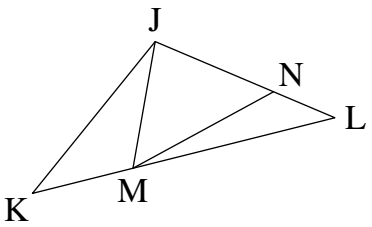
What is the area of the common (shaded) part?



A $\frac{5}{4}$ B $\frac{4}{5}$ C 1 D $\frac{6}{5}$ E $\frac{1+\sqrt{5}}{2}$

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18. In the diagram, $JK = JL$, $JN = JM$ and angle $KJM = 30°$.
What is the value of angle NML?

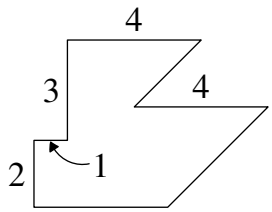


A $7\frac{1}{2}°$ B $12\frac{1}{2}°$ C $15°$ D $17\frac{1}{2}°$ E $20°$

19. For what value of x does $1 + \dfrac{16}{1 + \dfrac{1}{1 + \dfrac{1}{x}}} = 11$?

A $\frac{1}{2}$ B $\frac{3}{5}$ C $\frac{2}{3}$ D $\frac{3}{2}$ E $\frac{5}{3}$

20. All the angles in this figure are multiples of 45°. Some side lengths are given.
What is the perimeter of the figure?

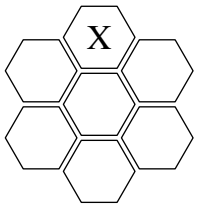


A $16 + 5\sqrt{2}$ B $18 + 5\sqrt{2}$ C $18 + 4\sqrt{2}$ D $16 + 4\sqrt{2}$
E $20 + 5\sqrt{2}$

21. The numbers x and y satisfy the equations $x + y = 6$ and $x^3 + y^3 = 198$.
What is the value of xy?

A 1 B 2 C 3 D 4 E 5

22. A bumblebee wants to visit all the hexagons in the diagram shown. He starts at X, only moves between hexagons that share a border, and never visits the same hexagon twice. How many possible routes could the bumblebee take?

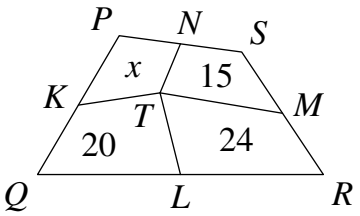


A 14 B 16 C 18 D 20 E 24

23. Oliver asked a group of people whether they liked Maths. Exactly 99% answered yes. Teresa asked a different group of people whether they liked Maths and combined her results with Oliver's. Now exactly 98% of the people had answered yes. What is the smallest number of people who could have answered no to Teresa?

A 1 B 2 C 3 D 4 E 5

24. The points K, L, M and N are the midpoints of the edges of the quadrilateral $PQRS$, as shown.
T is a point inside the quadrilateral. The quadrilaterals $KQLT$, $LRMT$ and $MSNT$ have areas 20, 24 and 15 respectively.
What is the area of the quadrilateral $NPKT$?



A 10 B 11 C 12 D 13 E 14

25. Zoe has an unusual method of choosing when to go swimming. At the beginning of the year she randomly chooses three different days of the week, then always has a swim on those days only. Using this method, what is the probability her schedule will include at least three days in a row without a swim?

A $\frac{2}{5}$ B $\frac{1}{2}$ C $\frac{3}{5}$ D $\frac{7}{10}$ E $\frac{4}{5}$

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