UK Maths Trust

Andrew Jobbings Senior Kangaroo

Wednesday 19 November 2025

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England & Wales: Year 13 or below | *Scotland: S6 or below* | *Northern Ireland: Year 14 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** to record your answer to each problem as a three-digit number from 000 to 999. For example, if your answer is a single digit like '4' please input '004'. Further instructions can be found on the Answer Sheet.
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;
   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 black pencil 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, or reject the answer sheet.
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.

Enquiries about the Andrew Jobbings Senior Kangaroo should be sent to:

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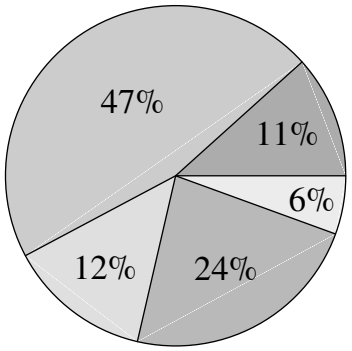
1. The product $2 \times 3 \times 5 \times 7 \times 11 \times 13$ has remainder r when divided by 100.

What is the value of $200 - r$?

2. The pie chart shows how exactly 2000 children in a particular town get to school. Note that the percentages in this pie chart are exact, without any rounding.
Approximately twice as many use a bicycle as use the bus. Roughly the same number come by car as walk. The rest come by train.

How many children use the train?



3. In a sum of five three-digit numbers 'ABC' + 'BCD' + 'CDE' + 'DEA' + 'EAB' = 2664, the letters A, B, C, D and E represent digits, which are not necessarily distinct.

What is the value of $10(A + B + C + D + E)$?

4. Kitty claims that for every positive integer n, the product $(5n + 1)(6n - 1)(n^3 - 2)$ is not divisible by 7.

What is the smallest three-digit value of n which is a counterexample to Kitty's claim?

5. The integers a, b, and c are such that $1 \leq a \leq b \leq c$ and $abc = 2^{16}$.

What is the largest possible value of b?

6. Three fair dice are rolled. The first dice has three red faces, two white faces and one blue face. The second dice has two red faces, two white faces and two blue faces. The third dice has one red face, two white faces and three blue faces. The probability that, following rolling, all three dice will show the same colour is $\frac{K}{1080}$.

What is the value of K?

7. What is the value of $\dfrac{(2025 + 20)^2 + (2025 + 25)^2 - (2025 - 20)^2 - (2025 - 25)^2}{1000}$,

rounded up to the next integer?

8. The first four digits of a 128-digit number are 2025.

How many digits does the square of this number have?

9. Nineteen integers, which are not necessarily distinct, are arranged in a circle such that the sum of the integers in any nine consecutive positions always has the same value, 2025.

What is the value of the largest of the nineteen integers?

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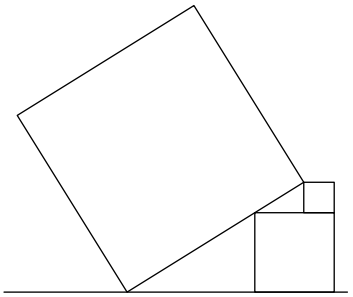
10. Three squares are shown in the picture. The area of the smallest square is 9, and the area of the middle-sized square is 81.

What is the area of the largest square?

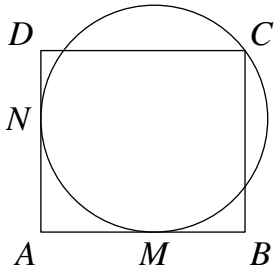


11. The sequence k_n is defined by $k_1 = 19$, $k_2 = 11$ and $k_{n+2} = k_n + k_{n+1}$ for $n \geq 1$.

How many of the first 2025 terms in the sequence are even?

12. A rectangle $ABCD$ and a circle are shown in the diagram.
Sides AB and AD of the rectangle are tangent to the circle at points M and N respectively.
The circle passes through C.
The length of AM is 15 and the length of MB is 12.

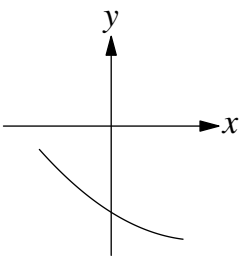
What is the area of the rectangle?



13. Part of the parabola with equation $y = ax^2 + bx + c$ is shown in the diagram.

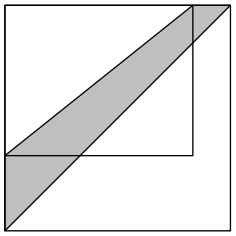
How many of the following expressions have positive values?

a	b	c	ab	bc	ca	$b+c$	abc



14. The length of one side of a rectangular park was increased by 20%, while the length of the other side was increased by 50%. After the changes the park is now square in shape. The shaded area shown between the two diagonals in the diagram is 210.

What was the original area of the park before the changes were made?



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15. The simultaneous equations (1) and (2) have at least two distinct (x, y) solutions.

$$2x + 5y = a - b \qquad (1)$$
$$4x + 10y = a + b \qquad (2)$$

The simultaneous equations (3) and (4) also have at least two distinct (x, y) solutions.

$$3x - 2y = a - b + 4 \qquad (3)$$
$$9x - 6y = a + 4b - 1 \qquad (4)$$

What is the value of $10a + b$?

16. The six interior angles of a convex non-regular hexagon, measured in degrees, are a, $a + d$, $a + 2d$, $a + 3d$, $a + 4d$, and $a + 5d$. All six angles are integer multiples of $10°$.

What is the value of $7a + 11d$?

17. The navigation app on my smartphone gives distances in both miles and kilometres. When planning a journey, I notice the distance in miles, m, and the distance in kilometres, k, are such that $m = k - 438$.

How long does my planned journey in miles work out to be if you use the approximation 1 mile = 1.6 kilometres?

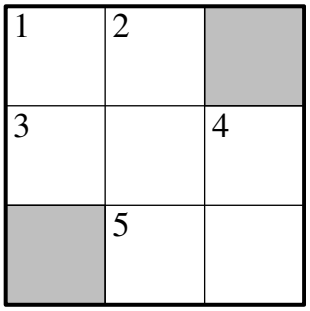
18. A teacher works out the number of different ways, W, she can choose two students from Class A. She also works out the number of different ways, V, she can choose two students from Class B. Class A has four more students in it than class B. She notices that $W = 3V$.

How many students are there in class A?

19. An *almost number* is defined as an integer which is divisible by exactly eight elements of the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$.

What is the largest *almost number* below 1000?

20. Each cell in this cross-number can be filled with a non-zero digit so that all of the conditions in the clues are satisfied. The digits used are not necessarily distinct.



What is the sum of the answers to the clues for

1 ACROSS, 3 ACROSS and 5 ACROSS?

ACROSS
1. A factor of 1221.
3. A multiple of 17.
5. A prime.

DOWN
1. A factor of 1221 different from 1 ACROSS.
2. A cube.
4. A prime.

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