

Remainders and logic (Junior UKMT)

These questions must be attempted without a calculator

Topics covered in the questions below may not necessarily be from the topic of the title.

1. What is the remainder when 7 000 010 is divided by 7?

A 1 B 2 C 3 D 4 E 5

2. I saw the following numbers on cars on the way to school. Each number, with one exception, has the same remainder when divided by 9.

Which is the exception?

A 113 B 257 C 554 D 725 E 861

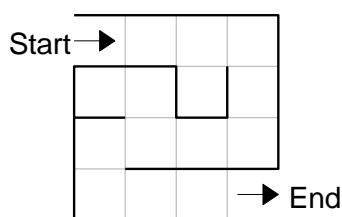
3. Exactly one of these statements is correct.

Which one?

A $44^2 + 77^2 = 4477$ B $55^2 + 66^2 = 5566$ C $66^2 + 55^2 = 6655$
D $88^2 + 33^2 = 8833$ E $99^2 + 22^2 = 9922$

4. Jonny's rat is a slow learner! Every time it goes through this maze, it visits every square at least once.

What is the smallest possible number of squares it visits more than once when it goes through the maze?



A 0 B 1 C 2 D 3 E 4

5. At the end of a hard day at the mine, the seven dwarves share out all their gold nuggets, making sure that they each get the same number of nuggets. If there are any left over, they are given to Snow White.

Which number of nuggets would leave Snow White with the most?

A 300 B 400 C 500 D 600 E 700

6. In this magic square, which uses all whole numbers from 7 to 15 inclusive, each of the rows, columns and the two main diagonals has the same total.

Which number replaces n in the completed square?

n		
		7
		14

- A 8 B 9 C 10 D 11 E 12

7. In this *Multiplication Magic Square*, the **product** of the three numbers in each row, each column and each of the diagonals is 1.

What is the value of $r + s$?

p	q	r
s	1	t
u	4	$\frac{1}{8}$

- A $\frac{1}{2}$ B $\frac{9}{16}$ C $\frac{5}{4}$ D $\frac{33}{16}$ E 24

8. The two-digit by two-digit multiplication on the right has lots of gaps, but most of them can be filled in by logic (not by guesswork).

Which digit must go in position *?

$$\begin{array}{r}
 4 - \\
 \times - - \\
 \hline
 - 8 - \\
 8 - 0 \\
 \hline
 - - 4 * \\
 \hline
 \hline
 \end{array}$$

- A 1 B 3 C 5 D 7 E 9

9. When 26 is divided by a positive integer N , the remainder is 2. What is the sum of all the possible values of N ?

- A 21 B 33 C 45 D 57 E 70

10. A positive whole number less than 100 has remainder 2 when it is divided by 3, remainder 3 when it is divided by 4 and remainder 4 when it is divided by 5.

What is its remainder when it is divided by 7?

- A 2 B 3 C 4 D 5 E 6