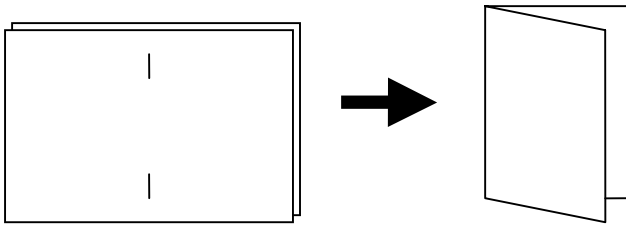




UKMT Team Maths Challenge 2003/04
Round One Group Competition

Question 1

An A5 booklet is constructed by stapling 20 sheets of A4 paper together down the middle and then folding

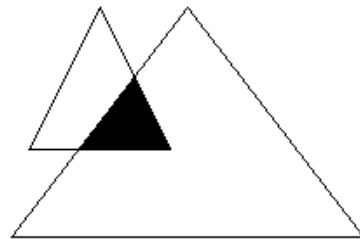


Starting with the front page, the pages are numbered consecutively from 1 to 80. A certain page is numbered 30. If the book is then unstapled, which other three numbers will appear on this same sheet of paper?

Question 2

The diagram shows two triangles which overlap to create the shaded region.

$\frac{2}{3}$ of the smaller triangle remains unshaded and $\frac{8}{9}$ of the larger triangle is unshaded. If the sum of the areas of the two triangles (when not overlapping) is 120 cm^2 , what is the area of the shaded region?



Question 3

What is the sum of all the factors of 2004?

Question 4

In the grid below, one of the letters U, K, T, M and C is to be placed in each square in such a way that the same letter does not appear in any horizontal, vertical or diagonal (45°) line. The grid is partially filled in. If the grid is filled in completely, what letter must be placed in the shaded square?

(Note that a diagonal is not necessarily a long diagonal, so for example, in the diagram, K and T lie on a diagonal)

			C	
	U			T
			K	

Question 5

Ebenezer Scrooge has an odd way of counting his gold coins. Firstly, he splits them up into two piles with numbers of coins in the ratio of 1:2. He then splits the smaller pile into two piles in the ratio 1:3. Then he splits the new smaller pile into two piles in the ratio 1:4 and so on. Eventually, having carried on for some hours, he splits the smaller pile in the ratio 1:7 and finds that the new small pile only contains one coin. How many gold coins does Ebenezer have in total?

Question 6

Tweedledum challenged Tweedledee to a general knowledge contest. For every answer Tweedledee got right, Tweedledum gave him 7p and for every answer Tweedledee got wrong, he had to give Tweedledum 3p. Tweedledum asked 50 questions and at the end of the competition, when everything was added up, neither owed the other any money! How many questions did Tweedledee answer correctly?



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Answers

1. 29, 51, 52
2. 10 cm^2
3. 4704
4. U
5. 20160
6. 15