BRAIN TEASERS

SIX CLASSIC NUMBER PUZZLES, WITH ANSWERS

EASY TO HARD | 6 PUZZLES | ANSWERS INCLUDED

Six puzzles for anyone who likes a sum with a twist, starting easy and finishing hard. None of them needs more than a pencil and some patience. They come from Amusements in Mathematics by Henry Ernest Dudeney, published in 1917, in his own words.

NO. 1 · EASY

THE ABBOT'S PUZZLE

"If 100 bushels of corn were distributed among 100 people in such a manner that each man received three bushels, each woman two, and each child half a bushel, how many men, women, and children were there?"

Now, there are six different correct answers, if we exclude a case where there would be no women. But let us say that there were just five times as many women as men, then what is the correct solution?

In plain English: This puzzle was old even in 1917. It goes back to Alcuin of York, a scholar who died in 804. 100 bushels of grain are shared among 100 people: 3 to each man, 2 to each woman and half to each child. There are five times as many women as men. How many of each are there?

NO. 2 · MEDIUM

THE HONEST DAIRYMAN

An honest dairyman in preparing his milk for public consumption employed a can marked B, containing milk, and a can marked A, containing water. From can A he poured enough to double the contents of can B. Then he poured from can B into can A enough to double its contents. Then he finally poured from can A into can B until their contents were exactly equal. After these operations he would send the can A to London, and the puzzle is to discover what are the relative proportions of milk and water that he provides for the Londoners' breakfast-tables. Do they get equal proportions of milk and water, or two parts of milk and one of water, or what? It is an interesting question, though, curiously enough, we are not told how much milk or water he puts into the cans at the start of his operations.

NO. 3 · MEDIUM

THE TRUSSES OF HAY

Farmer Tompkins had five trusses of hay, which he told his man Hodge to weigh before delivering them to a customer. The stupid fellow weighed them two at a time in all possible ways, and informed his master that the weights in pounds were 110, 112, 113, 114, 115, 116, 117, 118, 120, and 121. Now, how was Farmer Tompkins to find out from these figures how much every one of the five trusses weighed singly? The reader may at first think that he ought to be told "which pair is which pair," or something of that sort, but it is quite unnecessary. Can you give the five correct weights?

In plain English: Five bundles of hay are weighed two at a time, in every possible pair. The ten weights, in pounds, are 110, 112, 113, 114, 115, 116, 117, 118, 120 and 121. What does each bundle weigh?

NO. 4 · MEDIUM

A PRINTER'S ERROR

In a certain article a printer had to set up the figures $5^4 \times 2^3$, which, of course, means that the fourth power of 5 (625) is to be multiplied by the cube of 2 (8), the product of which is 5,000. But he printed $5^4 \times 2^3$ as 5423, which is not correct. Can you place four digits in the manner shown, so that it will be equally correct if the printer sets it up aright or makes the same blunder?

In plain English: Find four digits where the first to the power of the second, times the third to the power of the fourth, makes the four-figure number you get by writing the digits in a row.

NO. 5 · HARD

THE CLOTHES LINE PUZZLE

A boy tied a clothes line from the top of each of two poles to the base of the other. He then proposed to his father the following question. As one pole was exactly seven feet above the ground and the other exactly five feet, what was the height from the ground where the two cords crossed one another?

NO. 6 · HARD

THE THREE GROUPS

There appeared in "Nouvelles Annales de Mathématiques" the following puzzle as a modification of one of my "Canterbury Puzzles." Arrange the nine digits in three groups of two, three, and four digits, so that the first two numbers when multiplied together make the third. Thus, 12 × 483 = 5,796. I now also propose to include the cases where there are one, four, and four digits, such as 4 × 1,738 = 6,952. Can you find all the possible solutions in both cases?

In plain English: Use each of the digits 1 to 9 exactly once to make a multiplication. Either a two-figure number times a three-figure number makes a four-figure number, or a one-figure number times a four-figure number does. There are nine in all, including the two examples. How many can you find?

All six are from Amusements in Mathematics (1917), which is in the public domain. The worked answers are our own.