

Christmas Number Puzzles

An Elf Family

I met two of Santa's elves the other day – Rupert and his sister Ruperta. “We elves have very large families,” Rupert told me. “I have three times as many brothers as sisters.”

“And how do you feel about having three times as many brothers?” I asked Ruperta. “Don't be silly – I have **five** times as many brothers as sisters,” she replied. I looked puzzled for a minute.

“Surely now you can work out now how many boys and how many girls there are in our family,” she asked. Can you?

Delivering Decorations

One of Santa's elves has been out delivering chocolate snowmen to hang on trees at Santa's various grottos. “How did you get on?” asked Santa on his return.

“It was odd, really,” replied the elf. “I visited seven grottos. At the first grotto they wanted exactly half my snowmen, plus half a snowman.” “Half a snowman!” growled Santa, who was finding being jolly all the time a bit wearing, “I hope you haven't been chopping up my best decorations!”

“Let me finish,” said the elf. The odd thing was, at each of the seven grottos the same thing happened – they took half of the snowmen I had, plus half a snowman. At the end, I had no snowmen left. And I didn't chop up a snowman at all.”

How many snowmen did the elf deliver?

Snow in Lapland

The elves at the Lapland Weather Centre have been keeping records for quite a few days this year. They have found that whenever it snowed in the afternoon, it had been fine in the morning, but whenever it snowed in the morning, it was fine in the afternoon. So far it has snowed on 100 days, and been fine on 39 afternoons and 95 mornings.

For how many days have they been keeping a record?

Stepping up Production

The elves in Santa's workshop began making rocking horses straight after last Christmas and kept making them for 52 weeks. They gradually became able to make them more quickly, so that in the second week, they made one more rocking horse than in the first week, in the third week they made one more than in the second week, and so on, until in the 52nd week they made 1 more than in the 51st week.

When they counted up how many rocking horses they had made altogether, they found they had 2210. How many did they make in the first week?

A Christmas Cryptarithm

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In the addition sum on the left, each letter stands for a different digit (so if A is 5, M cannot also be 5). A letter stands for the same number everywhere it occurs (so if the M in “MERRY” is 5, then the M in “XMAS” must also be 5).

Can you work out what each letter stands for?

Snow Days!

At a school in the Highlands, if it snows, the school has to close for the day. The students have devised a system for passing on the news quickly.

Douglas, who is the deputy head's son, finds out first. He phones just two of his friends, Annie and Bernard. They then each phone just two other people, and so it goes on. One day Douglas finds out at 6.00am that the school will be closed. He phones Annie, which takes one minute. So at 6.01am two people know the news. Then he phones Bernard, which also takes a minute, and goes back to bed. So at 6.02am four people know the news (because Annie has made her first phone call too).

If each phone call takes a minute, and there are 1000 pupils in the school, at what time will the whole school know the news?

A Christmas Greeting

Each of the ten letters which occurs in the seasonal message "A MERRY XMAS TO ALL" represents a different digit from 0 to 9. Each word in the message is a square number, and also the sum of the digits in each word is a square number. Can you work out what each digit represents?