

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?