King Edward VI Camp Hill School for Girls

Maths Department Newsletter

12th December 2016

2 + 3 + 4 + 5 + 6 + 7 = 27

News

As you can see from the picture, Father Christmas was happy this morning, but that was before he sat down and worked out, using maths, how many houses he had to visit on Christmas Eve, and how long he will get to spend at each one. Some children wonder why they don't see him when he visits their house, but we know that it's simply because he has to move so incredibly quickly. Perhaps you could use some maths to work out roughly how fast Santa has to travel if there are about 12 million children in Britain and he has roughly 6 hours to visit them all.[1]

Christmas Cards

Trying to organise Christmas is a surprisingly mathematical thing though. For example, if everybody in a class of 25 students sends a Christmas card to every other member of the class, how many cards will be needed? What about if everyone in the class pulled a cracker with everyone else? How many crackers would be needed?[2]

Mince Pies

Lots of people eat mince pies at Christmas and Father Christmas is no exception. Last Christmas, Mrs Claus (her actual name is Mary Christmas, as you probably know) baked a batch of mince pies for the family. On his own, Father Christmas could eat them all in 20 days, but if Mrs Claus eats some too, they will finish eating all the mince pies in just 12 days. How long would it take Mrs Claus to eat them all by herself?

Joke

If I had a pound for every time somebody told me I was bad at maths, I'd have £3.47.

Puzzle

Can you complete this sequence from last year's GCHQ Christmas Quiz?

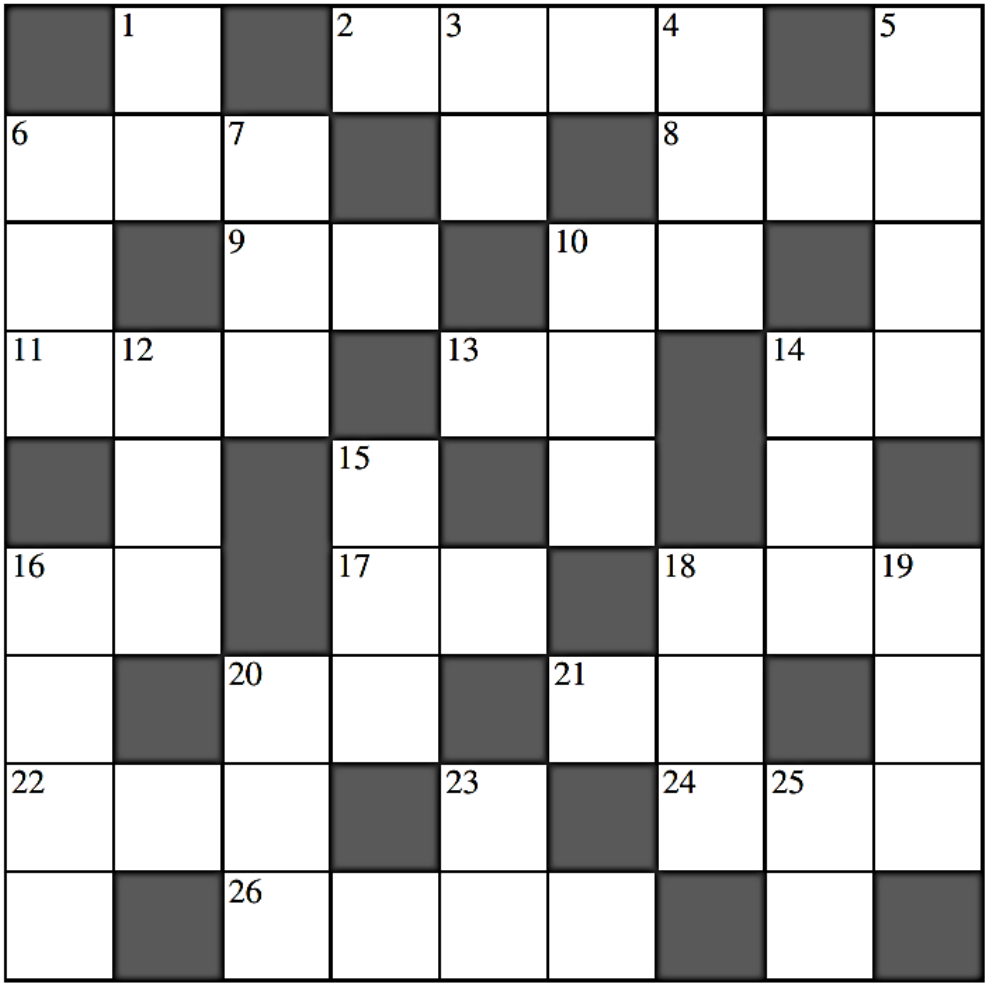
Buck, Cod, Dahlia, Rook, Cuckoo, Rail, Haddock, ?

Merry Christmas

On the back you'll find a crossnumber puzzle so that you don't have to go completely without maths over the Christmas holiday. We hope you have a good break, and please keep looking out for any interesting mathematical things. Let us know if you find any and we'll put them in the newsletter in the new year ☺

1. This is an example of a Fermi calculation. What assumptions do you need to make? Is your answer an overestimate or an underestimate?
2. The two answers are not the same.

Here's a fun puzzle for you, from the UK Maths Trust. Every time we enter a team into one of their competitions, they get 40 minutes to complete one of these. Can you do it in less that that?



Across

2. The smallest 4-digit palindromic cube (4)
6. A square plus its square root (3)
8. A number equal to the sum of the cubes of its digits (3)
9. $\sqrt{13^2 - 5^2}$ (2)
10. A factor of 10 Down (2)
11. The remainder when 26 Across is divided by 22 Across (3)
13. Four more than 1 Down (2)
14. A multiple of 17 Across (2)
16. The square of a prime factor of 2015 (2)
17. The highest common factor of 26 Across and 2015 (2)
18. 14 Across plus 25 Down (3)
20. A Fibonacci number (2)
21. 23 Down plus a non-trivial factor of 18 Down (2)
22. A multiple of 23 Down (3)
24. x where $4 = 5(x - 2) - 26$ Across (3)
26. 6 Across plus 15 Down (4)

Down

1. The largest prime factor of 2015 (2)
3. A multiple of 9 Across (2)
4. A Fibonacci number (3)
5. $9^3 + 10^3$ or $12^3 + 1^3$ (4)
6. The sum of its digits multiplied by an even number (3)
7. A cube (3)
10. A multiple of 10 Across (3)
12. The product of 13 Across and 16 Across (3)
14. A number equal to the sum of the cubes of its digits (3)
15. The mean of 6 Across and 7 Down (3)
16. 2 Across plus 26 Across (4)
18. A multiple of 11 (3)
19. 14 Down minus 9 Across (3)
20. A number that makes the sum of the six digits in its column equal to 17 Across (3)
23. The product of 17 Across and a square (2)
25. Both a square and a cube (2)