



King Edward VI Camp Hill School for Girls

Maths Department Newsletter

13th March 2017

30 is the first sphenic number

News

Lots of things have happened since the last newsletter. On Wednesday 8th March, we took twelve year 10 girls to the University of Birmingham to take part in their annual 'Big Quiz', which is basically a big maths quiz for schools in the local area. Over 50 teams took part¹, and our A team - Eleanor Barrell, Kujani Wanniarachchi, Spardha Raut and Susannah Watson - ended the day in first place. Obviously we are very proud of them all, so here are some photos of the girls before and after the competition.



Before the competition, outside the entrance to the great hall.



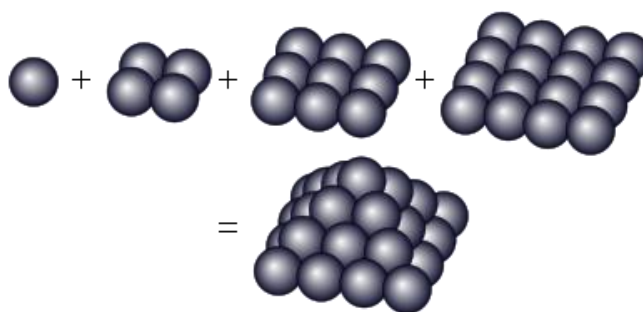
Back at school afterwards, with all the prizes.

Apparently, if we win this for three years in a row, we get to keep the big trophy.

1. We took three teams of four. The other girls involved were Emma Hillier, Anna Higgins, Heidi Rhodes James, Anshu Firake, Naiya Patel, Hanyu Yin, Sumayyah Amin and Megha Bhalla.

Maths Word

A square pyramidal number is any number that is the sum of the first n squares. 30 is the fourth one of these.



UKMT Team Challenge

On Tuesday 7th March, two year 8 and two year 9 girls took part in the UKMT Team Challenge, over at the boys' school. In the end, we came 3rd, out of the 26 teams that took part, which we think is a good result. It wouldn't really be fair to the other schools if we just won everything all the time, would it? We're nice people, as you can see from this photo taken of the team on the day.



Left to right: Naina Gupta, Kanakdurga Nanda, Mushkan Pradhan and Maya Patel.

Joke

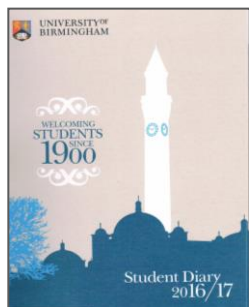
I wrote 10 new jokes about how I'm really bad at maths, but 6 of them were rubbish. Still, that leaves me with 8 good ones.

Diary Puzzle

When we were at Birmingham University on Wednesday, they were giving away free copies of their 2016-2017 academic year diary, probably because there aren't many months left now in this academic year, and nobody would want to buy a copy, just to use it for a few months. Obviously, I took a copy, because even though the days and dates won't match up next year, I know that in 28 years, they will because our calendar works on a cycle of 28 years; 28 being the lowest common multiple of 7 and 4.² I also know that I probably won't have to wait anything like that long though. 2017 started on a Sunday. I only need to wait for the next academic year, where the second half is a year that starts on a Sunday and is not a leap year. Can you work out when that year will be? This leads onto a more interesting maths question, namely "Which are the most useless diaries?" - in other words, are there any years, whose diaries you would have to wait the full 28 years to be able to use again? Also, which are the best diaries, where you would need to wait the minimum possible number of years to use them again? What even is this number? Are there any interesting patterns in the number of years you have to wait?³ This is how mathematics often works. Somebody asks a question, based on a fairly simple but interesting real world problem, and before you know it, you not only have a new maths puzzle, but you have invented a whole new kind of number called a "minimal diary number" and you've started to develop theorems about it, and who knows where it will all end?

2. Why do you think 7 and 4 are important here?

3. There will be. This is maths.



Did you know?

A sphenic number is a positive integer that is the product of three distinct prime numbers. 30, which is $2 \times 3 \times 5$ is the smallest. The next few are 42, 66, 70 and 78. The largest known sphenic number is $(2^{74,207,281} - 1) \times (2^{57,885,161} - 1) \times (2^{43,112,609} - 1)$, which is the product of the three largest known prime numbers. How many factors will a sphenic number have?

Maths Quote

"It matters not who first arrives at an idea; rather, what is significant is how far that idea can go." - Sophie Germain

If, however, you are struggling to arrive at any ideas in maths, you only need to go as far as room 13, on a Monday lunchtime, for maths workshop. 😊

Maths at Primark

It's the British Maths Olympiad and the Intermediate Kangaroo on Thursday 16th March, so we were pleased to see that Primark are celebrating this by selling a dressing gown featuring the letters BMO, with lots of mathematical symbols and shapes around it. Obviously, if you are a keen maths student, you should definitely get one of these. It's not often that fashion designers remember the British Maths Olympiad. Perhaps we should write to them and thank them, perhaps suggesting other mathematical clothing ideas.



Meanwhile, nobody has solved the cryptarithm from the previous newsletter yet. I'll give you the solution next time 😊