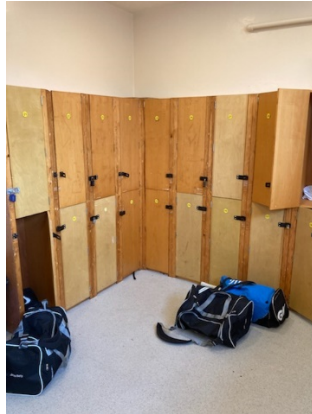


Dauntsey's 4th Mathematics Department Newsletter

October 2021

How algebra helped allocate Manor lockers



Manorites have lockers up at main school for storing their bits and pieces. In the case of the boys there are 58 lockers available to the 43 boys. TER decided to use algebra to help with the allocations. Firstly, he let x be the number of lucky boys having two lockers. He then made an equation in x to reflect the fact that two times x plus the number of boys who have a single locker must equal the total number of lockers. Have a go at forming this equation and then solve it – and check the solution at the end of this newsletter.

Lower school pupils in particular should have a good go at this.

Dauntsey's maths department reaches out

Towards the end of the summer term, three members of the Maths Department, aided by two Sixth Form students, visited three local primary schools with the Fun Maths Roadshow. This is a series of resources for practical mathematical activities which we have developed from the Liverpool Mathematical Society. The aim of the Roadshow is to promote the exploration of and mathematical discussion of the problems encountered, as well as just solving them. The pupils were in Years 5 and 6 and worked in pairs to solve as many problems as they could over an hour. Some of the pupils commented as follows:

“I enjoyed all of it!”

“I learned about problem solving and teamwork”

“Our team learnt more about geometry with the cube”

“I enjoyed making the shapes with triangles”

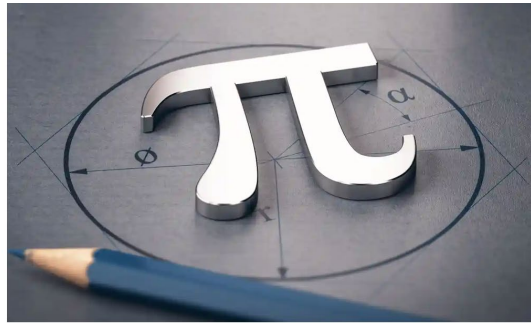
“We enjoyed the activity with the lolly sticks”

We look forward to bringing the Roadshow to some more Primary Schools next summer.

Maths in the news

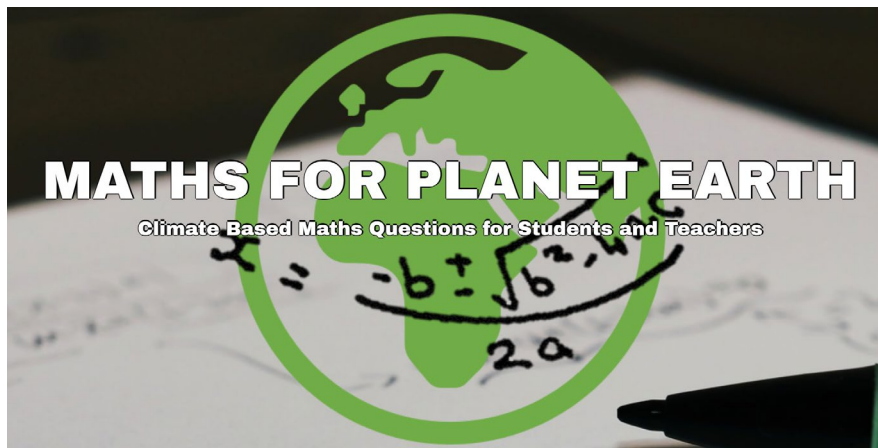
A Swiss university has set a new world record for calculating the number Pi to 62.8 trillion decimal places. The University of Applied Sciences in Graubünden said it had achieved the result using a high-performance computer that worked for 108 days and nine hours. Researchers at the university say they will only reveal the full results once the record has been certified by the Guinness Book of World Records. But the university in eastern Switzerland has said that the last ten digits of Pi are "7817924264".

3.1415926535897932384
62643383279502884197
16939937510582097494
45923078164062862089
98628034825342117067
98214808651328230664
70938446095505822317
25359408128481117450
28410270193852110555
96446229489549303819



Given that even calculating pi to 1,000 digits is overkill for any use of pi, it is reasonable to ask why bother going to 62.8tn decimal places? The exercise has been compared to Olympic athletes. World records are not useful by themselves, but they set a benchmark and they teach us about what we can achieve, and they motivate others. Extreme calculations of pi can also be seen as a benchmarking exercise for computational hardware and software.

Maths and COP 26



With the crucial COP 26 conference due to take place in Glasgow there is much focus at the moment on the climate emergency. Brainy mathematicians will be needed to tackle the climate emergency and Oxford University and the Environmental Change Institute have developed a web site with A' level and (I)GCSE style questions with a climate theme. Check out: <https://mathsforplanetearth.ouce.ox.ac.uk/>. This is a great place to go to help save the planet and practise your maths simultaneously.

Where maths A' level can lead



US Open champion Emma Raducanu has put some of her success down to her work ethic from studying A' levels. She likes to do her own homework on opponents and uses her learning discipline to analyse the games of her opponents prior to matches. Emma got an A* in mathematics prior to her unprecedented success in New York in September.

My mathematical journey

Lower Sixth mathematicians Flo and Lottie interviewed Mrs Ward from the Dauntsey's mathematics department. They write:

Mrs Ward did a mathematics degree at the university of Reading and graduated with a first, yet her journey to university was different than many. Mrs Ward did O' levels at secondary school and chose physics, maths and computing a-level, however she left at the end of lower 6th. She worked in the civil service and after marrying her husband at 22, they moved to Hong Kong and she had a job as a PA. Yet Mrs Ward had "always loved maths and regretted not doing something with it". She started doing Open University courses and then applied for Reading university, getting in without A' levels or an entry exam. Mrs Ward went to university when she was 36 and graduated in her 40th year, juggling family life and university.

Mrs Ward shared that when starting her degree she "wasn't even sure I would be good enough" and did find it hard, yet enjoyed it a lot. She found aspects of the challenge of the course fun, particularly having been one of few females on the course. She did work long hours for her degree, fitting them around looking after her children. In addition, having started her course later in life than many of her peers, Mrs Ward was not afraid to ask her lecturer to stop and explain anything, sharing that she has found "with age comes confidence", having wanted the best out of her university experience. At the end of the course, her lecturer told her that "these guys have no idea how much they have to thank you for" - referring to the fact that she had always been ready to stop the lecturer and ask for a clearer explanation that ended up benefitting the whole group.

After applying for Reading for the following year, Mrs Ward worked as a teaching assistant for a secondary school in Ascot, working with some of the lower levels of the Mathematics

Department. This, although challenging at times, is what affirmed the idea of teaching as her next career.

Later on, in her last year of university, she applied for her first teaching job at Dauntsey's, having already looked around the school for her children, then eight and nine. Her decision making was simple - teaching was what fitted best with her family life and commitments. However, she says "I went into it for family reasons but got way more out of it". She has been passionate about her teaching since, loving both the pastoral and academic sides equally.

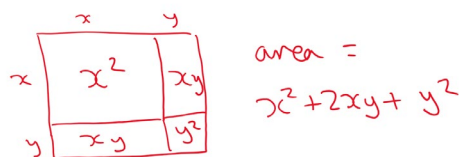
Mrs Ward has decided that this will be her last academic year at Dauntsey's, after 18 years of teaching here. Mrs Ward and her family will be travelling more, particularly spending lots of time out in France. Pupils and staff will be extremely sad to see her leave and she shares that she will miss it here a lot too but is ready for this change, and we all wish her the best of luck in this new chapter.

Avoiding the 'Rookie Error'

As maths teachers, we see many mistakes repeated day after day, sometimes by even fairly senior pupils. In this new section, we highlight some common (but hopefully avoidable) errors, in the hope that this will help prevent Dauntsey's pupils falling into such traps. The first example is a classic, with an interesting geometrical explanation of where the 'extra' $2xy$ comes from:

$$(x+y)^2 = x^2 + y^2 \quad \times \text{ ouch}$$
$$(x+y)(x+y) = x^2 + xy + xy + y^2$$
$$= x^2 + 2xy + y^2$$

or imagine finding the area of a square of side $x+y$:



Maths Clinics

All pupils are welcome to come to our Maths Clinics on Monday and Thursday afternoons during Long Break. A member of the department will be on hand to help with any mathematical issues:



Manor lockers – the solution

The equation is: $2x + (43 - x) = 58$. This can be simplified and then solved to give $x = 15$

So, 15 lucky 3rd formers have two lockers and the rest have one. After doing this calculation I realised that it would have been far easier to just allocate each boy a locker (so taking up 43 lockers). This then leaves 15 lockers unallocated, which could then be given as extra lockers to 15 boys. Maths is like this – there is usually more than one way to solve a problem, with some routes turning out quicker or simpler than others.

Dauntsey's Mathematics Department

October 2021