Mathematician of the week

Johann Freiderich Carl Gauss

Born 30th April 1777 - died 23rd February 1855

Gauss is sometimes known as the Prince of Mathematicians and along with Archimedes and Newton is considered one of the greatest mathematicians who ever lived.

He was born in Braunschweig in Germany to a very poor family. He was expected to become a bricklayer or a gardener however he had a pushy mother and uncle who decided he should go to school. He was a precocious child, at the age of three informing his father of an arithmetical error in a complicated payroll calculation and stating the correct answer.

At aged 10 his school teacher told him to add the first 100 numbers together. Within seconds he had shouted out the answer 5050. His teacher was furious. Do you know how he did it? At 14 he was introduced to the Duke of Brunswick who was so impressed that he paid for all of the rest of his education.

Aged 17 he became the first person to discover that you could construct a regular 17 sided polygon (a heptadecagon) inside a circle using only a compass and ruler. Not all polygons can be constructed and he proved that a heptagon (only 7 sides) cannot be constructed in this way. He wanted a heptagecagon engraved on his gravestone but the carver refused saying it looked too like a circle!

Gauss is famous for many other areas of maths including modular arithmetic which is used in codes and computers. In 1801 he proved the fundamental theorem of arithmetic that says that every positive integer (except 1) can be written as a product of prime numbers.

Here is the sort of question that Gauss liked to solve:

Modular arithmetic (the arithmetic of remainders) developed by Gauss helps us here. Try to think of a method don't just write a huge list out!

Trinity school offers a hot lunch option. On the first day the menu is pizza, spinach and brownies. The next day's menu is determined by replacing each item with the next one on the list. Thus on the second day of school the menu is hamburgers, peas and ice cream. When the bottom of the list is reached the cooks start again at the top; for example on the fifth day the menu is hot dogs, spinach and jelly.

Menu Planner		
Main dish	**Vegetable**	**Dessert**
Pizza	Spinach	Brownies
Hamburgers	Peas	Ice Cream
Spaghetti	Carrots	Pudding
Tacos	Beans	Cookies
Hot dogs		Jelly
Macaroni cheese		

1. What is the vegetable on the 27^{th} day of school?
2. What will the dessert be on the 64^{th} day of school?
3. What is the complete lunch on the 56^{th} day of school?
4. What is the complete lunch on the 85^{th} day of school?
5. On which on the first 50 days will spaghetti be served?
6. On which on the first 50 days will beans be served?
7. Will spaghetti and beans ever be served together? (explain)

Solutions to Gauss' quiz

1. Carrots (27 divided by 4 has a remainder of 3)
2. Cookies (64 divided by 5 has a remainder of 5)
3. Hamburgers, Beans and Brownies
4. Pizza, Spinach and Jelly
5. 3^{rd}, 9^{th}, 15^{th} 21^{st}, 27^{th} 33^{rd}, 39^{th}, 45^{th}.
6. 4^{th}, 8^{th}, 12^{th}, 16^{th}, 20^{th}, 24^{th}, 28^{th}, 32^{nd}, 36^{th}, 40^{th}, 44^{th} and 48^{th}
7. No. The school day spaghetti is served is always an odd number, whereas the school day for beans is always an even number.