πRATE

Without Mathematics, there is nothing that we can do. Everything around you is Mathematics. Everything around you is numbers.

-Shakuntala Devi

Editors' Note

October,2017

Dear Readers,

Welham has come a long way in 60 years. Even though we are taking out our second edition, we hope that this newsletter of ours becomes a legacy.

In an attempt to explore the scope of Mathematics, the newsletter talks about superstitions in Mathematics, its role in earthquakes, music and time travel.

Everyone knows the intricacies and set formulae of Mathematics which pertain to solving problems in textbooks. However, this edition of ours focuses on the unknown areas prevalent in Math.

Be real, be rational!
-Poorvi Parakh, Reddhi Poddar and Sreshti Goel.

SPEED MATHEMATICS

Squaring a two digit numbers-

$67^2 = [6^2][7^2]+20*6*7 = 3649+840 = 4489$

Similarly,
$25^2 = [2^2][5^2]+20*2*5 = 425+200 = 625$

Take one more example,
$97^2 = [9^2][7^2]+20*9*7 = 8149+1260 = 9409$

Here [] is not an operation, it is only a separation
Between the initial 2 digits and the last 2 digits.

Content

A Scientific Melody

"There is geometry in the humming of the strings; there is music in the spacing of the spheres."
— *Pythagoras*

Music, to many people, is a non verbal form of communication that goes past the human intellect and directly touches the soul. However, music is not really created by mankind, but only discovered, manipulated and reorganized by mankind. In reality, music is first and foremost a phenomenon of nature, a result of the principles of Physics and Mathematics. Math for instance, can be found in the tone system of music where the frequency of two notes has an octave difference of 1:2. The frequency relation of an octave thus proceeds in a geometrical progression of 1,2,4,8…

Music on the other hand also attempts to complement math. In fact, Einstein used to sit and play music when he was stuck on a mathematical problem. By concentrating on the problem at hand (left brain) while playing the piano or violin (right brain), he was able to strengthen the communication between the two hemispheres of his brain and increase his brainpower.

Hence, Mathematics, one of the most abstract forms of sciences, goes hand in hand with music, one of the most abstract forms of art.

Sreshti Goel
Class- 12

Mathematics in Earthquakes

Math is all around us. From the patterns of the flowers to the trajectory of an insects' path, everything involves mathematics. For any math phobic, logarithm is like a nightmare but this nightmare becomes a boon when used in calculating the magnitude of earthquakes.

Earthquakes are measured on three scales -Richter Scale, Modified Mercalli Intensity Scale and Moment-Magnitude Scale. The Richter scale, which is generally used in measuring the magnitude, calculates the intensity by describing the amount of energy released by the tremors at the epicenter. Since the Richter scale is based on logarithms. Every time the magnitude of the Richter scale increases by 1 unit, the amplitude of the seismographic curve increases 10 times while the energy released increases 30 times.

An earthquake of magnitude 0(log 1=0) and another earthquake of magnitude 1(log 10 =1) means that the amplitude of the seismic waves of the earthquake of magnitude 1 will be ten times more than that of the earthquake of 0 magnitude.

Hence, we can see the role of a Mathematical tool like logarithms in measuring the destructive intensity of a natural calamity. In future this data can be used by geologists to make more accurate predictions.

Gunchica Bhalla
Class–12

Algebra

I keep doing my homework,
Until my luck doesn't work .
After trying to understand which numbers
are real or fake,
26 alphabets represent it all,
X, Y and Z love going to the mall.

Here the question arises-
24 mangoes it buys,
And we need to tell from X or Y.
The confusion this equation creates,
Makes me scream, "Oh! For Christ sake!"
I try and try,
Until my head becomes a fish fry.

Oh! Algebra, grow up and find your 'x' yourself.
Stop asking this silly question.
Again and again.
Stop becoming a creep
And let me go to sleep.

Anvii Agarwal
Class-7

Attached below is the letter that was found crumpled and stashed underneath the teacher's table of SC class, addressed to Unit-1 of the SC math book.

Dear Unit-1,

When I try to 'relate' to your chapters, I find myself tearing out my hair in despair. During the course of my upbringing in Indian society, the process of learning the names and titles of every relation from 'Chacha' to 'Bhatiji' was enough to torment my confused little brain, but you felt it necessary to add to the load by introducing more 'relations' into my head. I feel no need to ask a 12th grader whether "a is a brother of a" when 'a' belong to a set of real numbers, but you seem to think otherwise.

Before you, the only 'injection' I knew of was the booster shot I received to prevent typhoid, only to have your 'injection' infect my brain with virus. We enter the zone of paranoia when you request us to prove a relation or function in exchange of a bribe of 4 marks! All of us on this side of the teachers' desk have deemed it as fraud, because according to you, "What is Math without an essay squeezed into it?"

Without further delay, I would like to thank you for succouring us to improve our hand writing and symbol-making skills.

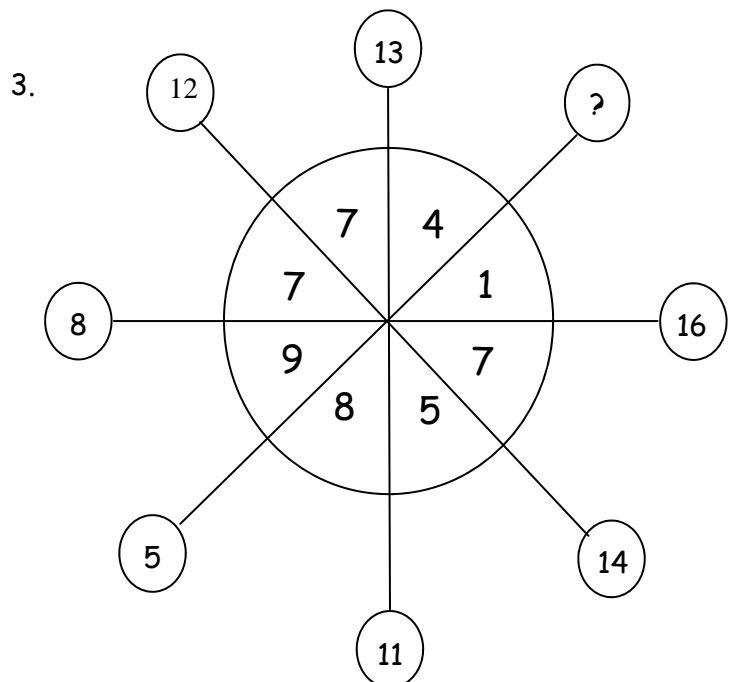Yours sincerely,
A lost Math Sc.
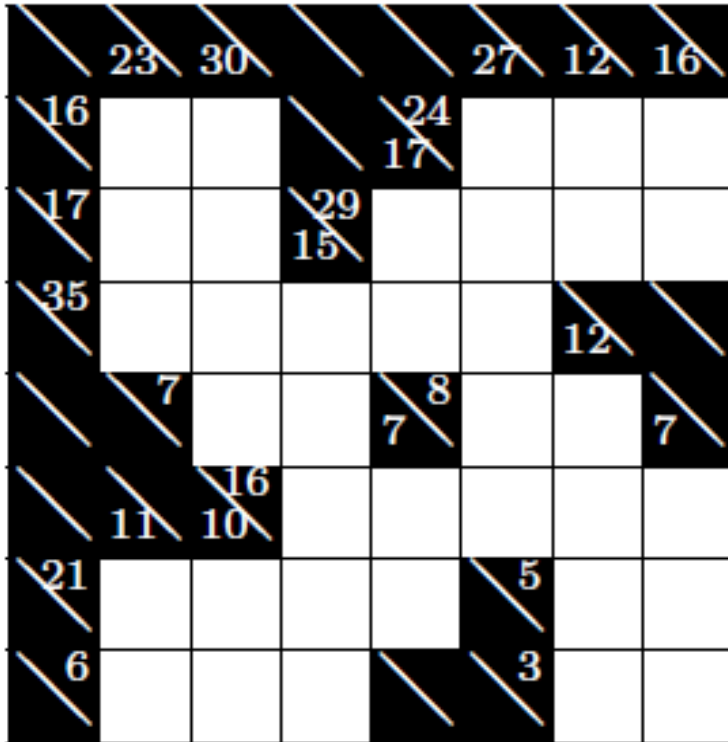
KAKURO

The object is to fill all empty squares using numbers 1 to 9 so that the sum of each horizontal block equals the clue on its left and the sum of each vertical block equals the clue on its top.

Brain Teasers

1.
```
1
1  1
2  1
1  2  1  1
1  1  1  2  2  1
3  1  2  2  1  1
?  ?  ?  ?  ?  ?  ?  ?
```

2.
```
 9   8   4
     2
 2   6   ?
```

3.

Crossword

Across:
1. A statement containing one or more terms separated by operators.
4. Sum of all sides of any shape.
5. Observation that occurs most frequently.
7. ? = $\dfrac{\text{Simple Interest} * 100}{\text{Time} * \text{Rate}}$
9. A five-sided figure.

Down:
2. The distance around the circle.
3. The angles whose sum is 180°.
6. It is neither positive or negative.
8. Arranging data in ascending or descending order.

-Aatmika Jain & Moulshree Agarwal

Class-7
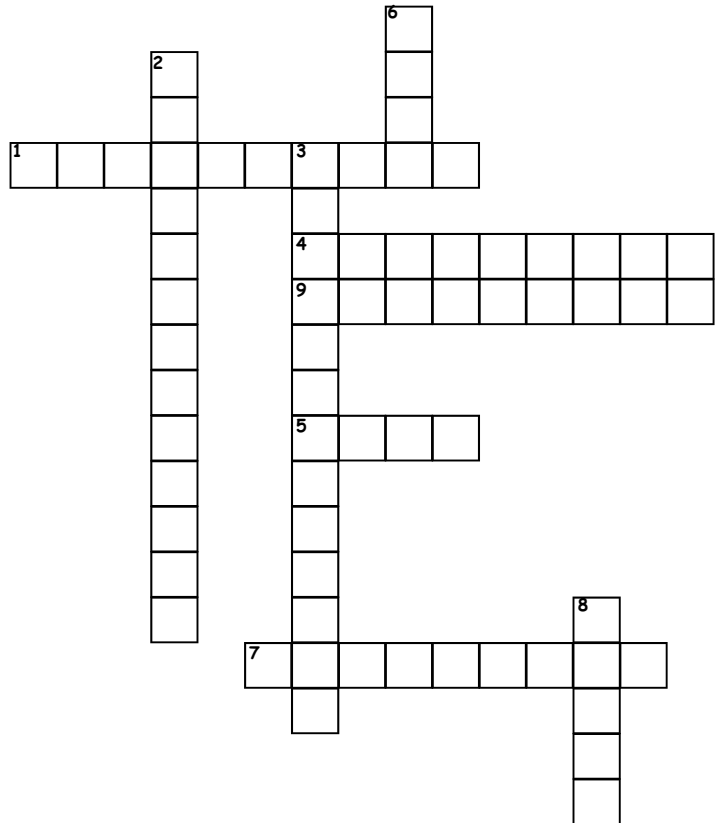
SUDOKU

Fill a 9x9 grid so that each column, each row, and each of the nine 3x3 boxes (also called blocks or regions) contain the symbols

α,β,γ,δ,ε,λ,μ,π,ω.

Is time travel possible?

After some serious number crunching and research over the possibility of time travel, Ben Tippett, a UBC Math and Physics professor has come up with a mathematical model for a viable time machine. Tippett, who is proficient in Einstein's theory of general relativity, studies black holes and science fiction in his leisure time. Using Math and Physics he has formulated an equation that describes a method for time travel. Talking about the feasibility of time travel, Tippett says, "People think of time travel as something fictional. And we tend to think it's not possible because we don't actually do it. **But, mathematically, it is possible."**

Ben Tippett

Ever since H.G. Wells published his book 'The Time Machine' in 1885, people have been curious about time travel and scientists have worked towards solving or disapproving the theory. Using Einstein's theory of general relativity, Tippett explains that the curvature of space-time accounts for the curved orbits of the planets. According to him, time direction of the pace-time surface also shows curvature. There is evidence to prove that the closer we get to a black hole, time moves slower. His model of a time machine uses the curved space-time—to bend time into a circle for the passengers instead of making them travel in a straight line. That circle would take us back in time.

While Tippett's theory can be proved mathematically, it is highly unlikely that anyone will ever build a machine to make it work. Even though time travel is mathematically feasible, it is impossible to build a space time machine because we need materials known as exotic matter to bend space-time in these impossible ways which are yet to be discovered.

According to Tippett, space time is both problematic and fascinating and it is fun to use Mathematics and Physics. Experts in his field have been exploring the possibility of mathematical time machines since 1949 and his research has presented a new method of doing it.

Shreya Gupta
Class-12

Mathematics and Superstitions

People over the ages have given special significance to numbers. Some people believe certain numbers are lucky or possess other powers besides simply describing a particular quantity. Many people have a lucky number, and people from various cultures find the number 13 to be unlucky.

Even the Pythagoreans had their own superstitions. According to them, numbers ruled the universe. They gave special importance to whole numbers and believed that if one was able to master their use, one could understand and influence the course of the universe. They even felt that numbers affected reason, health, justice and marriage.

Some of their superstitions were that 1 was the origin of all numbers. Even numbers were female, and 2, the first even number was a symbol of diversity of opinion. 3 was the first male number and was considered harmonious since it is a sum of 1 and 2, unity and diversity. The number 4 represented justice and 5 represented marriage, since it is a sum of the first female and male numbers.

It is interesting how we still consider numbers **lucky** or **unlucky** and talk about conquering time using these superstitious numbers of Mathematics on the other.
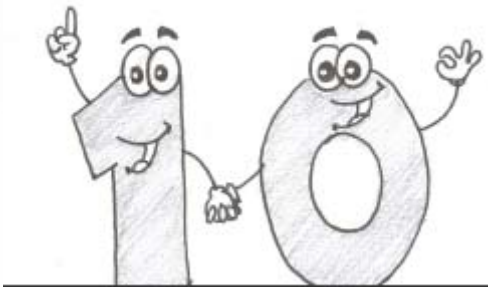
Poorvi Parakh
Class– 12

Facts

1. **Great Division:** 2520 is the largest number that can be perfectly divided by all the numbers between 1-10.
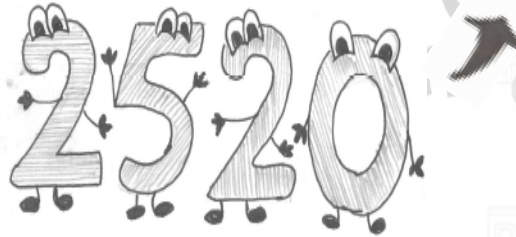
2. **Equals:** The = sign (equals sign) was invented by 16th century Welsh mathematician Robert Recorde, who was fed up with writing "is equal to" in his equations.

3. **Googol (10^{100}) :** It is said to have been coined by the nine-year-old nephew of Edward Kasner, American mathematician, Milton Sirotta.

4. **Kaprekar's Constant:** Choose a four digit number with at least two different digits. Arrange the digits of the four digit number in descending and then in ascending order. Subtract the smaller number from the bigger one. Repeat the steps. Eventually you'll end up at 6174, which is known as Kaprekar's constant. If you then repeat the process you'll just keep getting 6174 over and over again.

5. **Strange Numbers:** 73939133 is a strange prime number. If you keep removing a digit from the right hand end of the number, each of the remaining numbers is also a prime number. It's the largest number known with this property.

Careers in Mathematics

Geophysical Mathematicians develop the mathematical basis for seismic imaging tools used in the exploration and production of oil and gas.

Robotics Engineer combine Mathematics, Engineering, and Computer Sciences in the study and design of robots.

Economist interpret and analyze the interrelationships among factors which drive the economics of a particular organization, industry or country.
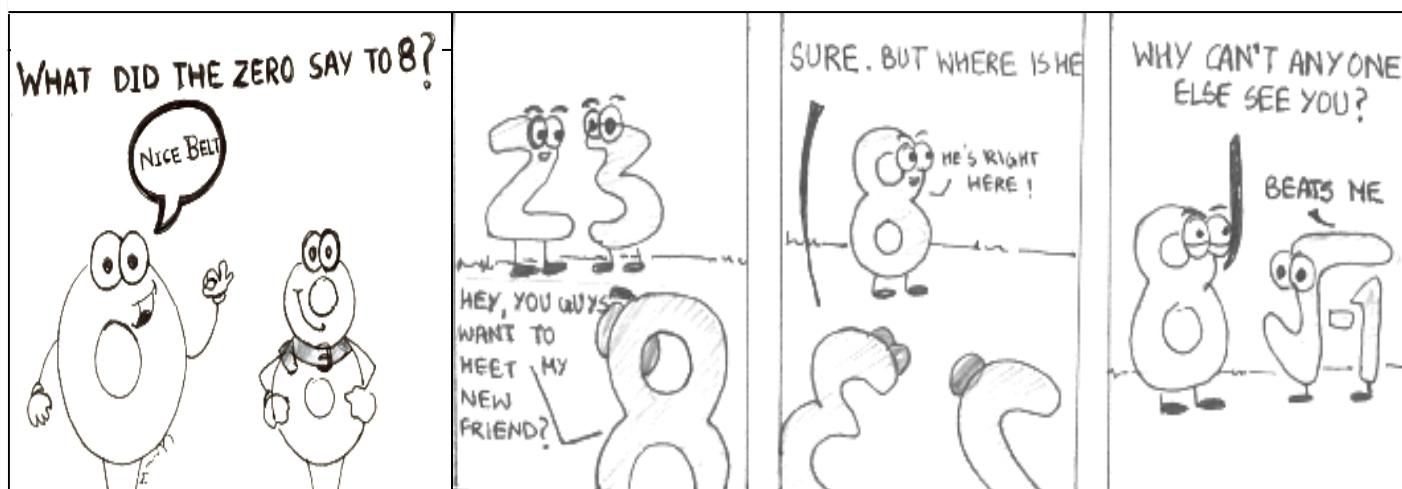
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