

Gyan Bharati School

# Quest...

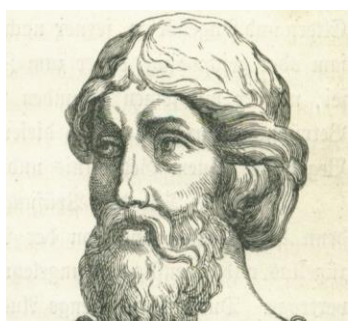
...monthly Science and Mathematics magazine

edition2/ September 2018

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“A man is like a fraction whose numerator is *WHAT HE IS* and whose denominator is *WHAT HE THINKS OF HIMSELF*, the larger the denominator, the smaller the fraction.”



Pythagoras, a Greek philosopher responsible for important developments in mathematics, astronomy and theory of music founded a philosophical and religious school in Croton that had many followers. Although the theorem, now known as Pythagoras’ theorem , was known to the Babylonians 1000 years earlier, he may have been the first to prove it.

Leonardo Pisano Fibonacci introduced the Fibonacci sequence which is a series of numbers such that every term except for the first two is the sum of the previous two terms.

1,1,2,3,5,8,13,21,34,55.....

This sequence of numbers has many fascinating patterns. One such patterns is the generation of Pythagorean triplets by applying a formula on them, as follows.

Pythagorean triplet:

First number =  $F_1 \times F_4$

Second number =  $2 \times F_2 \times F_3$

Third number =  $F_3 \times F_4 - F_1 \times F_2$



Challenges.....

1. Generate Pythagorean triplets from Fibonacci sequence by using the formula mentioned above.

F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>1</sub> × F <sub>4</sub>	2 × F <sub>2</sub> × F <sub>3</sub>	(F <sub>3</sub> × F <sub>4</sub> ) - ( F <sub>1</sub> × F <sub>2</sub> )
1	1	2	3			
13	21	34	55			
2	3	5	8			
3	5	8	13			
8	13	21	34			

Interestingly.....

Vedic Mathematics has a very simple method for finding Pythagorean triplets.

- Choose any odd number
- Square the number
- Split the square a sum of two consecutive numbers.  
**The original number and the split numbers form Pythagorean triplets.**
- Choose any even number
- Divide the number repeatedly by 2 until the result is an odd
- Then use the above method mentioned for odd number.

Challenges.....

2. Generate Pythagorean triplets using Vedic Mathematics method

19, 27, 56, 100

More challenges.....

3. There is a legend about the invention of the game of chess . A king offered inventor of chess the reward of his choice. The inventor asked for a seemingly tiny reward. He wanted a grain of wheat for the first square on the chess board, two for the second, four for the third, eight for the fourth and so on. The king was surprised at what he thought was a trivial amount and asked for a sack of brain to be given to the inventor, but he soon discovered that he had underestimated the quantity by a huge amount. After preliminary calculations, the king's prime minister informed him that the amount required would certainly bankrupt the country. The amount of grain was so large. How many grains of rice would the king have had to give?
4. An outstanding German mathematician in the field of abstract algebra emigrated to the USA in 1933. Her brilliant work in algebra laid the foundation for Einstein's theory of relativity. To know this mathematician's name, solve each of the following problems and cross out the answer from the squares shown in following figure. The letters in the remaining squares will reveal the name of this mathematician. Who is considered one of the greatest in the twentieth century.

- 1)  $3^2$    2)  $2^4$    3)  $4^0$    4)  $5^1$    5)  $3^{-2}$    6)  $10^{-1}$    7)  $3^2 \times 3^3$    8)  $4^{-6} \times 4^9$   
 9)  $2^{10} \times 2^{-12}$    10)  $5^{-2} \times 5^{-1}$    11)  $2^8 \div 2^2$    12)  $3^{12} \div 3^6$    13)  $5^{-8} \times 5^{-6}$    14)  $4^2 \div 4^{-2}$

$3^5$ S	5 O	8 E	-10 M	$3^6$ P	1 H
95 M	$1/25$ I	0 Y	4 N	9 A	6 O
$\frac{1}{4}$ G	-125 E	-4 T	$4^4$ N	-6 H	$1/10$ E
$4^3$ T	$1/125$ O	16 S	25 E	$2^6$ S	-54 R
$1/9$ I					

**IDENTIFY THE SCIENTIST:**

- ❖ Widely regarded as the father of India's space programme.
- ❖ Indian physicist and industrialist, he initiated space research and helped develop nuclear power in India.
- ❖ The famous VSSC, which is the Indian Space Research Organization's lead facility for launch vehicle development located in Thiruvananthapuram (Trivandrum), capital of Kerala state, is named in his memory.
- ❖ In 1973, the International Astronomical Union (IAU) decided that a lunar crater, Bessel A, in the Sea of Serenity will be known by his name.
- ❖ *Recipient of* Shanti Swarup Bhatnagar Award (1962), Padma Bhushan (1966) Padma Vibhushan, posthumous (after-death) (1972)

**BRAIN TEASERS:**

1. A man is trapped in a room. The room has only two possible exits: two doors. Through the first door there is a room constructed from magnifying glass. The blazing hot sun instantly fries anything or anyone that enters. Through the second door there is a fire-breathing dragon. How does the man escape?
2. Mary was born on December 25th, yet her birthday is always in the summer. How is this possible?
3. You awake inside a small transparent capsule sitting on the surface of Venus. From a small speaker you hear a voice that says, "We will leave you here either for a day or a year. If you choose to stay a day, we will give you \$1 million. If you choose to stay a year, we will give you \$2 million. Either way, you will have sufficient food and water. We will make sure the temperature is a constant 70 degrees Fahrenheit. We will also supply cable TV. "What is your choice? (Don't let money decide your answer).
4. A farmer has a wolf, a chicken, and a bag of grain he needs to get across a river. He has one boat to take them all across. He can only take one at a time. He can't leave the wolf alone with chicken or the chicken alone with grain. How does he do it?
5. How can you sink a needle that is floating in a bowl of water without touching it or shaking the bowl?

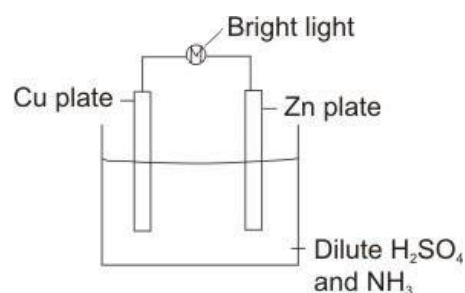
The outer auditorium roof contains lots of metal bars connected in triangular shape. Find out the advantages of the same in terms of strength

**Article 51A of Indian constitution makes it our fundamental duty “to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures.”**

Plastic is widely used in our day to day life. Starting from a pen to a polythene bag in which we carry fruits and books are forms of plastic. Though convenient in our day to day use, it has posed an alarming threat to the environment. It is non-biodegradable and do not decay by biological actions of microbes, To destroy plastics, we can either recycle or burn them. If we burn plastic, they emit harmful chemical gases like carbon dioxide ( $\text{CO}_2$ ), carbon monoxide (CO), nitrous oxide (NO), methane ( $\text{CH}_4$ ), sulphur dioxides ( $\text{SO}_2$ ), etc. These gases pollute our environment and endanger our environment. The wastes of plastic block pipes and sanitary lines so that dirty water came out on roads. This cause fear of malaria, cholera and other diseases. The wastes of plastic bags, bottles, etc. are drawn to a sea or an ocean by rivers and they are deposited in them. They pollute and disturb the eco-system of the sea or the ocean. Can you not make a small beginning to fight this menace? Discuss with your teacher and take some steps to make school plastic free and measure outcomes every month.

### Story of a cell.....

The first observed cell was actually a frog hanging from an iron railing using a copper hook. Dr Luigi Galvani (1737-98) a professor of anatomy in Italy hung a dead frog on an iron railing by a copper hook to dry. He observed that the legs of the frog shrank as they came in contact with the railing. He concluded that the electricity present in the body of the frog was the reason for it. His contemporary, Mr. Count Alessandro Volta, a professor of Physics in Italy, repeated the experiments and found that if the frog is hung with iron hook, its legs did not shrink. So two different materials separated by a chemical were the real cause of current and not the current within the body as was thought earlier. He invented a battery using sheets of copper, zinc and sulphuric acid as the intervening medium. We call it Voltaic Cell today.



Hints/ answers:

Vikram Sarabhai, VSSC -Vikram Sarabhai Space Centre, Sarabhai Crater

1. He waits for night and goes through the first door.
2. Mary lives in the Southern Hemisphere.
3. Choose to stay one year and win \$2 million. Venus takes 243 Earth days to rotate on its axis, but it takes 225 Earth days to go around the sun. On Venus a day is longer than a year.
4. He takes chicken first. He takes the wolf over second and comes back with the chicken. He drops of the chicken and takes the grain to the other side with the wolf. Last he goes back to get the chicken and brings him across.
5. Dish soap! The molecules in dish soap separate the water molecules from each other, and since the surface tension of the water is no longer as great, the needle sinks.

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