# Vedic Math World 

 MATH, LOGIC AND MUCH MORE...THE WORLD CELEBRATED $\boldsymbol{\pi}$ - DAY AS INTERNATIONAL DAY OF MATHEMATICS


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## FOCUS

SHARING THE WORDS OF THE INSPIRING PERSONALITIES


## SHRI PARASHOTTAM RUPALA

Union Minister (State) - Agriculture, Guiarat

## MATH-MANTRA

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## HON'BLE UNION MINISTER'S WORDS

'Mathematics' is essential for life and as I have worked closely with children as a school Principal in parluctan_af my career, I completely understand the in INDEX 'Mathematics' in the development of a child's brain.

Vedic Mathematics is a gem of our ancient Indian education system. The Vedic literature has a lot many mentions of mathematical advancements. This magazine, 'Vedic Math World' - is beautifully designed with major focus on Vedic Math tricks, math problems, logical ability enhancing questions, math news from around the world and the learnings from scriptures.

I liked the concept of 3D magazine 'Vedic Math World' designed by Vedic Math Learning System (VMLS) a lot. I am sure, 'Vedic Math World' shall be extremely useful for all the schools/ teachers and students. 'Vedic Mathematics' shall help the readers build a smarter approach, whereas, the tint of Indian scriptures shall make the Indian youth understand the greatness of our country in a better way, which is very much required in today's time.

I congratulate both the editors, Mr. Hardik K Parikh and Ms. Paridhi Trivedi Parikh, and their team for all valid and detailed research for creating this very educative magazine with altogether a new concept.

Best Wishes,

[Union Minister (State) - Agriculture, Gujarat]


## SHRI BHUPENDRASINH

 CHUDASAMA Cabinet Minister - Education.

HON'BLE EDUCATION MINISTER'S WORDS
'Mathematics' has the ability to empower a person's logical skills. If a child feels happy while solving the math questions, he/she automatically starts developing interest in the subject. 'Vedic Mathematics' does it all for the child. It makes child love math. I would say, it is an 'innovation'.

I congratulate you to bring out this e-Magazine aiming at the genre of 'mathematics' through the medium of Vedic Math Learning System (VMLS). I was very happy to see seven different focus-zones in the magazine dealing with Mathematical Problems, Vedic Math Tricks, Logical skills, Learnings from Indian scriptures, Various puzzles, Latest news and updates about mathematical field and great Indian heritage in the field of math. This content shall be definitely helpful in growing the reader's intellect.

I am sure, this e-magazine shall be extremely useful for the students, teachers, principals, and to everyone who is interested in 'Mathematics' or 'Vedic Mathematics' with the flavour of the knowledge from ancient scriptures.

I, once again congratulate them for their unique initiative and I am sure it shall be extremely useful to the education fraternity. All the best.


## Bhupendrasinh Chudasama

[Cabinet Minister - Education, Gujarat]

## SANSTHAPAKS' NOTE

 FOCUS
## THE CONCEPT OF ‘PI’ WAS VERY FIRST GIVEN DURING 800BCE IN INDIA!

Namaskar!
Many wishes to all the readers!

India represents one of the oldest civilizations on this planet. India is known for its advancement in mathematics and sciences. Many mathematicians and scientists worldwide are now recognizing it. On $14^{\text {th }}$ March, the world celebrated the 'Pi-DAY' in the form of INTERNATIONAL DAY OF MATHEMATICS.

This motivates the entire team of 'VEDIC MATH WORLD' to bring out some really interesting facts about the magical number 'pi' in front of the readers. It would be interesting to know the fact about ancient roots for 'pi' being present in India. 'Pi' has its mention in Sulba-sutra which were written almost 2800 years ago in 800BCE. The very first person to give the correct approximate value of 'pi' was none other than Aryabhata. The first person to give the fraction of 'pi' was another mathematical legend 'Bhaskara'. The first person of the world who gave the infinite series of 'pi' was Madhava who estimated the exact value of pi in $14^{\text {th }}$ century. Almost after 300 years before Gregory and Leibniz's formula was formed! Earlier infinite series of estimation of the value of


## MR HARDIK K PARIKH

Sansthapak -Vedic Math Learning System Chief Editor -Vedic Math World


MS PARIDHI TRIVEDI PARIKH Sansthapak -Vedic Math Learning System Editor -Vedic Math World 'pi' was known as Gregory-Leibniz series. Today, it is referred to as the Madhava-Gregory-Leibniz series. So, the entire world has accepted the mathematical genius of India named 'Madhav' and his work!

Apart from this, this issue of 'VEDIC MATH WORLD' covers the very interesting information about applications of 'pi' in the real world, MUST-KNOW facts about 'pi', ancient Indian reference to the concept of binary number system during 300BCE, world-wide news of Mathematics, a lot many math and logic questions and yes, the most favourite MATH-MANTRA QUIZ and a lot more!
Have a knowledgeable read!

Keep learning!

## HARDIK K PARIKH | PARIDHI TRIVEDI PARIKH

'Building Careers, Shaping Lives!'

# MATH NEWS N' UPDATES 

ONCE AGAIN INDIAN MATHEMATICIAN IN NEWS: NIKHIL SRIVASTAVA - ONE OF THE WINNERS OF MICHAEL AND SHEILA HELD PRIZE
Nikhil Srivastava, along with two others i.e., Adam Marcus and Daniel Alan Spielman, won the prestigious 2021 Michael and Sheila Held Prize. This prize is given annually. It is carrying a hefty prize amount of $\$ 100,000$. This prize is given to honour outstanding, innovative, creative, and influential research in the areas of Mathematical algorithms and complexity theory. The prize was established in 2017. Nikhil Srivastava got this prize for solving long-standing questions on the Kadison-Singer problem and on Ramanujan graphs and in the process uncovered a deep new connection between linear algebra, geometry of polynomials, and graph theory that has inspired the next generation of theoretical computer scientists. Nikhil Srivastava is from the University of California, Berkeley. Adam Marcus is from the Ecole Polytechnique
 Federale de Lausanne (EPFL). Daniel Alan Spielman is from from Yale University. The trio receives the 2021 Michael and Sheila Held Prize.

## INTERNATIONAL DAY OF MATHEMATICS WAS CELEBRATED ON 14 ${ }^{\text {TH }}$ MARCH:



International day of mathematics is also known as 'ग(Pi) Day'. Pi Day is an annual celebration of the mathematical constant $\pi$ (pi). The reason that 'Pi' Day is observed on March 14 is basically 3,1 , and 4 are the first three significant digits of $\pi$ as we all know the value of pi is 3.14 approximately. For more than 30 years, the fourteenth day of March i.e., $14^{\text {th }}$ March, has been celebrated as 'Pi Day'. It is a way of reminding the world about this magical number. 'Pi' defines as the ratio of the circumference of a circle to its diameter. According to the modern data available, it was founded in 1988 by Larry Shaw, an employee of the Exploratorium. But the amazing fact is the value of pi was known during ancient India. Many of the ancient Indian mathematicians calculated the exact value of 'pi' during those times. To know more about it, don't miss to read the 'DID YOU KNOW?' column. To add to this, 'Pi day' celebrations often involve eating pie or holding pi recitation competitions in various educational institutions.

## EXPERTS SUGGESTED MATHEMATICS PORTION OF JEE-MAINS (MARCH2021) IS TOUGHER THAN IT WAS LAST SESSION

The joint entrance examination main march exam was tougher than last session. Most student who appeared for the JEE main 2021 found mathematics question being tricky and difficult to attempt as compare to physics and chemistry was rated as the easiest. As per the students review many numerical based questions required lengthy

## JEE MAINS <br> CALCULATIVE MATHEMATICS QUESTIONS MADE THE PAPER DIFFICULT

 calculations which consumed a lot of time of candidates appearing in the exam. VEDIC MATHEMATICS can be greatly helpful to solve lengthy and calculative questions in less time.
## RESEARCHERS DISCLOSE THAT LARGE LANGUAGE MODELS STRUGGLE WITH MATH



Large language models like OpenAl's GPT-3 and Google's GShard learn to write humanlike text by internalizing billions of examples from the public web. Researchers disclose that advanced as machine learning models struggle to answer bilk of math problem correctly. To measure the problem-solving ability of large and general-purpose language models, the researchers created a dataset called MATH, which consists of 12,500 problems taken from high school math competitions. Training models on the fundamentals of mathematics required the researchers to create a separate dataset with hundreds of thousands of solutions to common math problems. Even with the solutions, the researchers found that accuracy remained low for the large language models they benchmarked: GPT-3 and GPT-2, GPT-3's predecessor. Having the models generate their own solutions before producing an answer actually degraded accuracy because while many of the steps were related to the question. In particular, providing models with solutions at training time increased accuracy substantially, with pretraining on Auxiliary Mathematics Problems and Solutions boosting accuracy by around 25\% equivalent to 15 times increase in model size.

## RESEARCH BY A MATHEMATICS PROFESSOR: A NEXT LEVEL OF RELEVANCE DURING THE COVID-19 PANDEMIC

The research of a retired lowa mathematics professor has taken on a next level of relevance during the COVID-19 pandemic. Herb hethcote did study in building mathematical models to track the spread of infectious disease during his 37-year career. He published 73 papers showing how models can predict the spread of viral disease and how to reduce it. he formulated and mathematically analysed many mathematical models for infectious diseases in homogeneously mixing populations and determined thresholds for different behaviours. He analysed models with increasing complexity, such as multiple interacting groups, variable population sizes, age structure, nonlinear incidence, and delay differential equations. After developing the theory, he started using infectious disease modelling to study specific diseases such as gonorrhoea, HIV/AIDS, measles, rubella, chickenpox, smallpox etc. According to him, the paper is essentially a how-to manual for building a mathematical model for infectious disease transmission and it is especially relevant during a pandemic.

## MATHEMATICS CAN SAVE LIVES AT SEA



Hundreds of people die at sea every year due to vessel and airplane accidents. Emergency teams have little time to rescue those in the water because of the less probability of finding a person alive in a plummet after six hours. Beyond tides and challenging weather conditions, unsteady coastal currents often make search and rescue operations exceedingly difficult. The researchers have undergone the TRAP-based search algorithm in two separate ocean experiments near the north-eastern coast of the United States. Working from the same real-time data available to the Coast Guard, the they successfully identified TRAPs in the region in real time. They found that buoys and manikins thrown in the water indeed quickly gathered along these evolving curves.

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## POWER OF ‘VEDIC MATH’

AN IMPORTANT VEDIC MATH SUTRA: निखिलम् नवतश्चरमं दशत:

## INTRODUCTION:

FINDING OUT ‘NIKHIL’:

* A process known as 'Nikhilam'is an extremely important process in the curriculum of 'Vedic Math'.
* It is a widely used process in various types of Vedic calculations.

DEFINITION: When two numbers have their sum 10 or in the powers of 10, then they both are 'Nikhil' numbers of each other.

## WHAT IS ‘NIKHILAM’ OF 4?

$4+X=10$
$X=10-4$
$X=6$
Nikhil of 4 is 6 . Nikhil of 6 is 4 . And $6+4=10.10$ is the 'Nikhilesh' of both the numbers i.e. 4 and 6 .

## DEFINITION OF 'NIKHILESH':

The sum of the both Nikhil numbers is called nikhilesh. (as explained above).
$(X)+($ Nikhil of $X)=$ Nikhilesh of $(X)=$ Nikhilesh of (Nikhil of X)
(Nikhil of X) = Nikhilesh -X
Applying the above to find Nikhil of 4. As the number given is of one digit (i.e. 4) so nikhilesh of 4 contains only one zero. First digit is always 1 in nikhilesh. So, nikhilesh of 4 becomes 10.
(Nikhil of 4) $=($ Nikhilesh of 4$)-4=10-4=6$
Thus, Nikhil of $4=6$

## PECULIARITIES OF 'NIKHILESH':

1. It is always in the power of 10 i.e. 10, 100, 1000, 10000, etc.
2. Its first digit would be 1.
3. All of its digits other than the first would be zero only.

## WHAT IS 'NIKHILAM’ OF 90?

$90+X=100$
$X=100-90$
$X=10$
Nikhil of $90=10$

## TO SUBSRIBE OUR YOU-TUBE

CHANNEL

Nikhilesh of both 90 and $10=100$

WHAT IS ‘NIKHILAM' OF 600?
$600+x=1000$
$x=1000-600$
$X=400$
Nikhil of $600=400$
Nikhilesh of both 600 and $400=1000$

## WHAT IS 'NIKHILAM' OF 9000?

$9000+X=10000$
$X=10000-9000$
$X=1000$
Nikhil of $9000=1000$
Nikhilesh of both 9000 and $1000=10000$

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Ultimately, when we need to find Nikhil of any number, we need to subtract the given number from the nikhilesh of the given number and it is very easy to find out nikhilesh of any number i.e. put 1 and that follows the same number of zeros as many digits a number has.

If we observe carefully, to find out Nikhil of any number, we need to subtract the number from its nikhilesh means we need to subtract the last digit of the number from ten and rest all digits from 9. (you can try to understand it practically).

And, the understanding that we have just now created makes an important deduction for Vedic Math System i.e. 'Nikhilam-Navatsh-Charamam-Dashatah'(निखिलम् नवतश्चरमं दशतः)

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## MEANING OF THE SUTRA: निखिलम् नवतश्चरमं दशत:

'Nikhilam-Navatsh-Charamam-Dashatah'
निखिलम् When two numbers have their sum 10 or in the powers of 10, Then they both are Nikhil numbers of each other.

नवत: From nine (9)
चरमं Right most last non-zero digit
दशत: From ten (10)
So, the complete meaning of निखिलम् नवतश्चरमं दशत: ‘To get Nikhil of any number, subtract all the digits from 9 and the last right most digit by 10.'

## SMART TRICK

FINDING OUT 'NIKHIL' ('NIKHILAM')
FIND THE ‘NIKHIL’ OF 3058.
$9-3=6$
$9-0=9$
$9-5=4$
$10-8=2$
So, the answer is 6942.

## FIND OUT ‘NIKHIL’ OF 786534.

$9-7=2$
$9-8=1$
$9-6=3$
$9-5=4$
$9-3=6$
$10-4=6$
So, the answer thus becomes 213466.

## PRACTICE TASK

FIND OUT THE 'NIKHIL' AND THE ‘NIKHILESH' OF THE GIVEN NUMBERS.
1)758
2) 987
3) 678903
4) 938465828
5) 763292
6) 98367289
7) 1298
8) 198731
9) 9821

## SMART TRICK

## FINDING OUT 'NIKHILESH'

$(X)+($ Nikhil of $\mathbf{X})=$ Nikhilesh of $(X)=$ Nikhilesh of (Nikhil of $\mathbf{X})$
FIND THE ‘NIKHILESH’ OF 8013.
Nik/hilesh contains as many zeros as the digits of the given number and ' 1 ' before that. So, here 4 digits so 4 zeros and 1 ahead of it. So, the Nikhilesh is 10000.

## MATH-MANTRA

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# LOGIC QUEST MAKE YOUR BRAIN THINK! 

## FOCUS

PUZZLES, RIDDLES, LOGIC QUESTIONS

BRAIN TEASERS

## COMPLEX LINEAR SITTING ARRANGEMENT

AN IMPORTANT TYPE OF LOGICAL DATA INTERPRETATION
INDEX

## INSTRUCTION FOR Q1 TO Q4:

There are ten people A, B, C, D, E, P, Q, R, S and T sitting in two parallel rows. five persons namely A, B, C, D and $E$ are sitting in row 1 and face north. $P, Q, R, S$ and $T$ are sitting in row 2 and face south direction but not necessary in the same order.

* Therefore, in the given arrangement each member seated in a row faces another member of the other row.
* S sits one of the extreme ends of row.
* Two persons sits between $S$ and the one who face $C$.
* $B$ is immediate right of $C$ and $R$ faces $A$.
* $R$ is not immediate neighbour of the one who face $D$.
* Q and T are immediate neighbours to each other.
* More than two persons sit between B and D.

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* Q does not face person who sits immediate right of $C$.

1. Who among the following person sit immediate right of $\mathbf{A}$ ?
(a) B
(b) D
(c) E
(d) $P$
(e) None of these
2. Who among the following person sits second to the right of one who face $\mathbf{P}$ ?
(a) C
(b) $A$
(c) Q
(d) $R$
(e) D
3. Four of the following five are alike in certain way based from a group, find the one that does not belong to that group?
(a) S
(b) D
(c) T
(d) R
(e) B
4. How many persons sit between $\mathbf{Q}$ and the person who face $\mathbf{D}$ ?
(a) Three
(b) Two
(c) More than three
(d) One
(e) None

## TO WATCH THE VIDEO SOLUTION OF THIS QUESTION: CLICK HERE

Before you go through the solution, you must try to solve the above question yourself.

| CORRECT ANSWERS |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Answer_1 | (e) None | Answer_2 | (a) C | Answer_3 | (d) <br> R | Answer_4 | (b) Two |

## DETAILED SOLUTION:

This is the concept of linear arrangements. To solve such questions, one needs to go through each clue one by one and then keep on making the complete arrangements. Let's try to solve it, together.

There are ten people $A, B, C, D, E, P, Q, R, S$ and $T$ sitting in two parallel rows. five persons namely $A, B, C, D$ and $E$ are sitting in row 1 and face north. $P, Q, R, S$ and $T$ are sitting in row 2 and face south direction but not necessary in the same order. This is the general instruction given and this makes the skeleton of the arrangement clear in our mind, which is as given below:


## P, Q, R, S and T are sitting in row 2 facing South <br> A, B, C, D and E are sitting in row 1 facing North

Therefore, in the given arrangement each member seated in a row faces another member of the other row. Now, as we know that, 'S' sits one of the extreme ends of row. 'S' sits in the first row. So, he either can sit on extreme left of the row or to the extreme right. So, the below two cases are possible.

| $\mathbf{S}$ |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |


|  |  |  |  | $\mathbf{S}$ |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |

Two persons sits between S and the one who face C. So, the below cases are possible.

| $\mathbf{S}$ |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  | $\mathbf{C}$ |  |$\quad$|  |  |  |  | $\mathbf{S}$ |
| :--- | :--- | :--- | :--- | :--- |
|  | $\mathbf{C}$ |  |  |  |

$B$ is at immediate right of $C$. Putting this clue also into the account, there are two cases available. The following arrangements are possible.

| $\mathbf{S}$ |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | C | B |


|  |  |  |  | S |
| :--- | :--- | :--- | :--- | :--- |
|  | C | B |  |  |

The further given clue is that, R faces A. Now, as we do not know about the positions of either R or A. We can just add to our information where they can not sit. We can get till here that places in both the rows must be empty in order to place $R$ and $A$ facing each-other.

| $\boldsymbol{X} R$ |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $\mathbf{S}$ |  |  |  |  |
|  |  |  | $\mathbf{C}$ | $\mathbf{B}$ |

$\mathbf{X} \mathrm{R} \mathbf{X} \mathrm{R}$

|  |  |  |  | $\mathbf{S}$ |
| :--- | :---: | :---: | :---: | :---: |
|  | $\mathbf{C}$ | $\mathbf{B}$ |  |  |

$R$ is not immediate neighbour of the one who face D. Now, we can not get clarity out of this clue and hence we can not conclude this clue at present. So, without wasting time on thinking the various cases in ambiguous manner, we must choose to skip this clue for now and keep it for end. ------(1)

Q and T are immediate neighbours to each other. Here also, it is not clear. So, we shall choose to skip this clue at this juncture and jump on the next. We shall come back to this at last. (2)

More than two persons sit between B and D. This nullifies the second case as there in no such arrangement possible. So we are left with only one case further. Now solving this clue as given in the below figure.

| $\mathbf{S}$ |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| $\mathbf{D}$ |  |  | $\mathbf{C}$ | $\mathbf{B}$ |

Last clue given says, Q does not face person who sits immediate right of C . This helps us to nullify the positions of Q . Focus on the arrangements given below.

| $\mathbf{X}$ |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| $\mathbf{S}$ |  |  | R | R |
| $\mathbf{D}$ |  |  | $\mathbf{C}$ | $\mathbf{B}$ |

Now, going back to the left-out clue (1), which says, $R$ is not immediate neighbour of the one who face $D$. Thus, the position of $R$ shall be fixed. Have better understanding by below given figure.

| $\boldsymbol{X} R$ |  |  |  | $\boldsymbol{X} \mathrm{R}$ |  |  | $\mathbf{X} \mathrm{X} \mathrm{Q}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{S}$ |  | $\mathbf{R}$ |  |  |  |  |  |
| $\mathbf{D}$ |  |  | $\mathbf{C}$ | $\mathbf{B}$ |  |  |  |

Now, going back to the left-out clue (2), which says, Q and T are immediate neighbours to each other.
Thus, the position of R shall be fixed. Q doesn't sit opposite to B. Have better understanding by below given figure.

| $\mathbf{X} \mathrm{R}$ |  |  | $\boldsymbol{X} \mathrm{R}$ |  |  | $\mathbf{X R} \mathbf{X} \mathbf{Q}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{S}$ |  | $\mathbf{R}$ | $\mathbf{Q}$ | $\mathbf{T}$ |  |  |
| $\mathbf{D}$ |  |  | $\mathbf{C}$ | $\mathbf{B}$ |  |  |
| $\mathbf{X A}$ |  |  |  |  |  |  |

Now, we have used all clues and we need to fill up the gaps. As, only one space is let in the first row, that space shall be filled with $P$, whereas in row-2 two spaces are filled with $A$ and E. Here, we need to recall that $R$ faces $A$.

| $\mathbf{X} R$ |  |  | $\mathbf{X} R$ |  |  | $\mathbf{X} \mathbf{X} \mathrm{Q}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{S}$ | $\mathbf{P}$ | $\mathbf{R}$ | $\mathbf{Q}$ | $\mathbf{T}$ |  |  |
| $\mathbf{D}$ | $\mathbf{E}$ | $\mathbf{A}$ | $\mathbf{C}$ | $\mathbf{B}$ |  |  |

So, now all the five questions can be answered very easily.

# CAN YOU SOLVE THIS?? (CYST) 

## QUESTION \#1

If $1=3,2=3,3=5,4=4,5=4$. Then, $6=$ ?

## QUESTION \#2

What is the number of parking space covered by the car?


You have only 15 seconds to solve this question.

## VIDEO SESSION LINKS FOR THIS SECTION CLICK HERE

## QUESTION \#3

What Number Should Replace the Question Mark?
HINT: This may not be a number. Think of a situation in everyday life where these numbers appear.

| 1 | 3 | 5 |
| :--- | :--- | :--- |
| 2 | 4 | $?$ |

## QUESTION \#4

Find out the numbers in the boxes representing Question-mark (?).

| $?$ | + | $?$ | $=$ | 8 |
| :--- | :--- | :--- | :--- | :--- |
| + |  | + |  |  |
| $?$ | - | $?$ | $=$ | 6 |
| $=$ |  | $=$ |  |  |
| 13 |  | 8 |  |  |

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YOUR REVIEW TO
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## QUESTION \# 5

If $12 \times 12=9$ and $23 \times 23=16$ then, with the same logic $34 \times 34=$ ?

|  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| CORRECT ANSWERS | INDEX |  |  |  |
| Answer_1 | Answer_2 | Answer_3 | Answer_4 | Answer_5 |
| 3 | 87 | R | $35,45,95,35$ | 13 |

## DEAILED SOLUTIONS:

Answer_1: The answer is ' 3 ', because 'six' has three letters so answer is ' 6 ' = which has three letters i.e., ' 3 '.
Answer_2: Believe it or not, this "math" question actually requires no math whatsoever. If you flip the image upside down, you'll see that what you're dealing with is a simple number sequence.
Answer_3: It's a lever in the car with numbers on it. It's a gear stick. So, the question mark will be replaced by the letter ' R '.
Answer_4: We can form four equations. $A+B=8, C-D=6, A+C=13, B+D=8$. Let's solve these four equations and find the variables $A, B, C \& D$ ! If we add the four equations. $A+B+C-D+A+C+B+D=8+6+13+8.2(A+B)$ $+2 C=35.2 C=35-2^{*} 8$ (by replacing $A+B$ ). $2 C=35-16=19 . C=9.5$. from 2nd Equation $C-D=6 . D=C-6, D$ $=9.5-6, D=3.5$ from 3rd equation $A+C=13, A=13-C, A=13-9.5, A=3.5$. from 4th equation $B+D=8, B=$ 8 - D, B = 8 - 3.5, B = 4.5.

| 35 | + | 4.5 | $=$ | 8 |
| :--- | :--- | :--- | :--- | :--- |
| + |  | + |  |  |
| 95 | - | 35 | $=$ | $\mathbf{6}$ |
| $=$ |  | $=$ |  |  |
| $\mathbf{1 3}$ | 8 |  |  |  |

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Answer_5: After performing the multiplication, we reach the result by adding the individual numbers that make up the result. If $12 \times 12=144$, then $1+4+4=9$. If $23 \times 23=529$, then $5+2+9=16$. If $34 \times 34=1156$, then $1+$ $1+5+6=13$.

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# CONCEPTS \& APPROACHES 

FOCUS
STRENGTHENING CONCEPTS \&
EARN INTELLIGENT CONCEPTS, APPROACHES \& VARIOUS TRICKS
CONCEPT OF MENSURATION AND USAGE OF Pi

## INTRODUCTION

'Pi' plays an important role in geometrical and mensuration concept-based problems. When we take about mensuration, area and volume comes into the picture. Now, before digging much on this topic, a few formulae must be known by each and everyone. So, this column today shall share the important formula of mensuration which can be helpful in your school examination as well as in any entrance examination. So, let's revise as given below.

| SQUARE |
| :--- |
| Area $=a^{2}$ |
| Perimeter $=4 a$ |
| Diagonal, $d=\sqrt{ } 2 a$ |



RIGHT ANGLED TRIANGLE
Area $=(1 / 2) b x h$ sq. units
Perimeter $=\mathrm{b}+\mathrm{h}+\mathrm{H}$
Hypotenuse $(H)=\sqrt{ } b^{2}+h^{2}$


## AREA OF THE TRIANGLE WHEN INRADIUS IS GIVEN

$A=r \times s$

## HERON'S FORMULA FOR FINDING AREA OF THE TRIANGLE WHEN ALL THE THREE SIDES ARE GIVEN <br> $A=\sqrt{ } s(s-a)(s-b)(s-c)$ <br> $s=(a+b+c) / 2$ <br> Perimeter=(a $+h+r)$



# IHE GREAT INDIAN MATHEMATICIANS KNOW ABOUT INDIAN BRAINS! 

## FOCUS

ACHARYA PINGALA - THE FATHER OF BINARY NUMBER SYSTEM (300BCE)<br>Interesting History of Binary Number system by an Indian Mathematician

## INTRODUCTION:

We all do card magic tricks and try to entertain people, bringing their attention towards us. But do you know how this magic tricks actually works. Some people may know, some are unaware to this, So Let me tell you, this magic trick applies binary number system.

Do you know? Ancient Indian's were the earliest to discover the binary number system.


## HISTORY BEHIND BINARY NUMBERS

Let's reveal the historical story behind the Binary Number System. In Ancient India there was a mathematician named, ARCHARAYA PINGALA who had discovered the immense possibility of binary number system. So, let us read about this interesting mathematician, and about his discovery.

## WHO IS ACHARYA PINGALA?

Pingala was an ancient Indian poet and an accidental mathematician who lived around 300 BCE. Few things are disclosed about Acharya Pingala. He was the writer of Chandahsastra, in which he interpreted Sanskrit poetry mathematically. It also stated the first known explanation of Binary number, Fibonacci numbers and Pascal's Triangle.

## WHAT IS CHANDAHSHASTRA?

It means the science of meters used in the poetries for recitation. While studying this, Acharya Pingala discovered the concept of binary number system.

## SO HOW ARCHARYA PINGALA DISCOVERED THE BINARY NUMBER SYSTEM?

* Archaraya Pingala worked on 'Chandah' which refers to one of the six Vedanga. 'Vedangas' are know as the arms of Vedic studies.
* In Sanskrit Prosody or 'Chandah' , there are ‘Dheerga swar' or Long pronunciation and the 'Laghu swar' or short pronunciation.
* The combination of long and short swar is the basis of Sanskrit prosody or 'Chandah'.
* Science of meters is explained in a musical way in Chandah Prosody.
* So, While studying Chandah, Archaraya Pingala came across the concept of Binary number system.
* In Chandahsastra, the first known description of a binary numeral system shows connection of the systematic enumeration of meters with fixed patterns of short and long syllables.
* The Chandahsastra or the study of composing poetry based on two kinds of syllables:

1. Binary numeral system
2. Combinatorics of meter corresponds to the binomial theorem

* Pingala could explain the concept of binary numbers bit he was unaware about the usage of zero that time, so he used light (/aghu) and heavy (guru) rather than 00 and 11 to describe syllables.
* Acharya Pingala discovered the different patterns of Binary numbers and a notation similar to Morse code.
* Binary numbers uses 0 and 1, so sometimes use of zero is ascribed to Pingala due binary numbers. Pingala used Laghu (light) and Guru (heavy) rather than 0 or 1 to describe syllables. In a Classical Sanskrit Literature there is a verse, this verse determines the arrangement of long and short swars. Dheergha is the last syllable in meter. So let us refer to the long/ dheergha swara as Guru.


## AN EXAMPLE OF THE COMPOSITION BY ADI SHAKARACHARYA

A very famous stranza of 'Bhavani Ashtakam' composed by Adi Shankaracharya is as follows, न तातो न माता न बन्धुर्न दाता
न पुत्रो न पुत्री न भृत्यो न भर्ता।
न जाया न विद्या न वृत्तिर्ममैव
गतिस्त्वं गतिस्त्वं त्वमेका भवानि ॥१॥
In the above stranza, there are 12 letters in each quarter. These letters are arranged in a pattern such that it has, Laghu + Guru + Guru format of the pronunciation. And this pattern is followed through out. This meter is called 'Bhujangaprayatam'.
As $2^{12}=4096$, so total 4096 arrangements can be calculated with just 2 types of swars i.e., 'laghu' and 'guru' and total 12 letters. This concludes that one can arrange letters in 4096 ways to create a stanza. Pingala introduced a technique of Pratyay (algorithm), Prastaarfor all possible combinations of a syllable for a quarter with "n" letters.

GANITANAND ACTIVITY CODE \#231

## MAGIC OF 'Pi' !

## FOLLOW THE FOLLOWING STEPS

## STEP1:

Take a bangle or a saucer or a dish anything that is completely round in shape.

## STEP2:

Find out its diameter with the help of ruler, sketch-pen and thread. Here, you need to think the way of using the tools suggested in order to find the

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## STEP3:

Divide the diameter by ' 2 ', which gives the value of radius. It must be clear that diameter $=2 \times$ radius.

## STEP4:

Take an adhesive tape which has width of 1 cm .

## STEP5:

Cover the entire circular thing that you have taken with the help of the above-mentioned tap. Measure the length of the tape used. Please take care while using the adhesive. You need to keep check on the length of it before sticking it up on the thing. First you are supposed to measure and then you are supposed to stick.

## STEP6:

Write down the cm of adhesive tape used.

## STEP7:

Divide the (length of the tape $x$ width of the tape) with the diameter of the circular thing taken.

Devoid of whatever thing is chosen by you of whatever size, everyone of you shall get answer 3.14. Think about the reason of this happening!

# RESPECT YOUR ROOTS! <br> INDIAN SCRIPTURES, FESTIVALS \& PERSONALITIES 

## FOCUS

LEARNINGS FROM ANCIENT INDIA

## HISTORY OF AN INTERESTING MATHEMATICAL NUMBER ‘ $\Pi^{\prime}$ 800BCE - 1200 AD

## INDEX



## INTRODUCTION:

There are some interesting numbers in mathematics are transcendental numbers like $\pi$ and e . The idea of numbers basically stated with the natural numbers i.e., $1,2,3,4,5, \ldots$ up to infinite. Then, concept of zero and place-value came into the picture. India gave the gift of zero to world, so world got an idea of calculations. It is very much apt to say that India gave the world an idea of place value system in a proper way. Ancient Indian texts have many references showing very big numbers in that age, which clearly suggests the advancement of Mathematics then in the Indian subcontinent.
'Pi' as we know is defined as the ratio of the circumference of a circle to the double of its radius (diameter). 'Pi' has a very interesting history. Why people in ancient times were interested in calculating 'pi'? Why the value of 'pi' at high degree was required? If we analyse on simple grounds, we can get the answer of the above question in a way that one can't avoid 'pi' because it is ultimately the one element which helps in
calculating area of the circular spaces. The nature of 'pi' was always found mysterious then and now we have defined it as a transcendental number. A transcendental number is a number that is not algebraic, which means it is not the root of a non-zero polynomial with rational co-efficient.

INDIAN ROOTS AND VALUE OF PI:

## The great ancient Indian Mathematician MADHAVA

## World's first person to estimate the exact value of $\pi$ (pi)

$$
\frac{\pi}{4}=1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\cdots=\sum_{n=1}^{\infty}\left(\frac{(-1)^{n-1}}{2 n-1}\right)
$$

'Pi' is an irrational number and concept of irrationality is difficult to understand. Exact representation of pi requires the infinite series on right hand side. According to the modern data available, infinite series representation of pi is ascribed to is Gregory and Leibniz who accomplished this task in 17th Century. But, almost in 14th Century, there was a series which was codified in the form of a verse by an Indian mathematician Madhava. Almost 300 years before Gregory and Leibniz's formula came to the fore! Earlier it was known as Gregory-Leibniz series. Today, it is referred to as the Madhava-Gregory-Leibniz series. The entire world has accepted the mathematical advancement of India. Below given series is Madhava-GregoryLeibniz series for infinite representation of pi.

$$
\frac{\pi}{4}=1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\cdots=\sum_{n=1}^{\infty}\left(\frac{(-1)^{n-1}}{2 n-1}\right)
$$

Sadratnamala text appears to give the value of pi correct to the 17 deccimal places i.e., $\pi=3.14159265358979324$. Madhava's work on various series are found in 'Tantrasamgraha' and

INDEX in the commentopries of the same in "Madhava's own words".

## REQUIREMENT OF CALCULATING PI FOR INDIANS



In idea during ancient and medieval period, each and every household was having three kinds of fire altars to perform various rituals. These three kinds of altars were in the form of square, circle and semicircle. These were together called as 'Tretagni'. The constraint that the people imposed was, all the three-altar mist have the same area. Now, all of us can connect the dire requirement of people for calculating 'pi'. Before Madhava, a lot of work regarding to pi had happened in India. And, we do have the proofs of the same from the 'Vedic Age'. Let's explore about it!

## VEDIC \& MEDIEVAL REFERENCES OF PI:

## SULBA-SUTRA

We have got some reference in Sulba-sutra which has value of pi. Sulva-sutras were written in 800BCE.

## ARYABHATA

After Sulba-sutra, the very first Indian to represent the value of pi with four digits after decimal was none other than but Aryabhata! He calculated the value of pi and documented in his book named Aryabhatiya in $5^{\text {th }}$ century. Below is the reference of the verse from Aryabhatiya. चतुरधिकं शतमष्टगुणं द्वाषष्टिस्तथा सहस्ताणाम् | श्रप्रयुतद्वयविष्कम्भ स्यासन्नो वृत्तपरिणाहः ॥ १० ॥


Meaning: Add 4 to 100, multiply by 8 , and add 62,000 . The result is approximately the circumference of a circle of which the diameter is 20,000.

## Mathematical representation:

$\frac{(100+4) x 8+62000}{20,000}=\frac{62832}{20,000}=3.1416=\pi$

## BHASKARACHARYA

Bhaskaracharya in his mathematical book Lilavati gives Aryabhata's fraction was reduced to the original fraction of pi i.e., 22/7.

अथ वृत्तक्षेत्रे करणसूत्रं वृत्तम् |
व्यासे भनन्दाग्नि (३९२७) हते विभक्ते
खवाणसूर्यैंः (१२५०) परिधिः स सूक्ष्मः।
द्वाविंशति (२२) घ्ने विहृतेऽथ शैलैः (७)
स्थूलोऽथवा स्याद्व्यवहारयोग्यः ॥
Meaning: When the diameter of a circle
 is multiplied by three thousand nine hundred and twenty-seven and divided by twelve hundred and fifty, the quotient is the near circumference: or multiplied by twenty-two and divided by seven, it is the gross circumference adapted to practice.

## Mathematical representation:

$\frac{D \times 3927}{1250}=\frac{D \times 22}{7}=2 \times \frac{22}{7} \times r=2 \prod r$

## CONCLUSION

This was a humble try to make the Indians feel the depth of Indian scholars and the sharp intellect of Indians since ancient times. We have been one of the oldest civilizations of the world. People born on this land are peaceful and progressive from ancient times. The spirituality has made the Indians calm and focused. The sharp intellect has provided the great problem-solving capacity to the Indian brain. The knowledge of Mathematics and Science marks extreme importance whenever it comes to solve the day-to-day problems of life. Thus, Indians have always been on top whenever Scientific or mathematical invention comes into the picture. The world celebrated the pi-day on $14^{\text {th }}$ of March and, this article is the tribute of the Indian Mathematicians who have worked extensively on the same magical and interesting number 'pi'.

# DID YOU KNOW? THE FACTS YOU MUST KNOW 

## PRACTICAL APPLICATIONS OF 'Pi' IN REAL WORLD:

* 'Pi' is very important to find area and circumference of a circle. You might not be using directly in the everyday life but, 'Pi' is used in most calculations for building and construction, communications, music theory, quantum physics, air travel, aeroplane construction, medical procedures, space flight, etc.
* 'Pi' is extremely important and fundamental mathematical building block. It opens extreme horizons of geometrical implications and understanding for human brains.
* 'Pi' plays a very important role in many of the major scientific advancements designed for mankind.

* 'Pi' is used in various concepts ranging from geometry to probability to navigation.
* Common real-world application problems involve:
- Understanding Mensuration of circles, cylinders, spheres, cones.
- Finding circumference (one-dimensional), area (two-dimensional), or volume (three-dimensional).
* 'Pi' plays an important role in calculating areas of the skin of the aircraft or the arc length, as well as in machining parts for aircraft.
* One interesting fact is, NASA uses Pi is to determine the size of craters and extrasolar planets, figuring out how much propellent a spacecraft has, and learning what an asteroid is made of.
* It is also used in the circular slot for mounting a camera which has a certain radius and a certain arc length.
* 'Pi' is also used in understanding the signals of various electronic items like radio, tv, radar, telephone, etc.
* It is also used in the all area of engineering to simulate unknown factors and loading conditions.
* Electrical engineers used pi to solve problems for electrical applications.
* Statisticians use pi to track population dynamics. Medicine benefits from pi when studying the structure of the eye.


## WHAT IS THE EXCAT VALUE OF PI?

\& In decimal form, the value of pi is approximately 3.14.

* Pi is an irrational number, which means, its decimal form neither ends (like $1 / 2=0.5$ ) nor becomes repetitive (like $1 / 3=0.33333 .$. ).
* The value of pi till 18 decimal places is 3.141592653589793238 .

Biochemists see pi when trying to understand the structure/function of DNA.

* Physicists looking into the behaviour of fluid ripples see pi and use it in their calculations.
* Clock designers use pi when designing pendulums for clocks.
* Signal processing and spectrum analysis i.e., finding out what frequencies are in the wave you are using) uses pi since the fundamental period of a sine wave is $2(\mathrm{pi})$. Navigation, such as global positioning (GPS).
* Calculating the number of deaths in a population. Solving Mathematics problems in Geometry like finding the area of circle etc.
* Reference of 'Pi' can be found within our body. DNA or deoxyribonucleic acid is the main constituent of chromosomes and the carrier of genetic information, which gives biological instructions making each species unique. DNA is 1.8 meters long and forms the nucleus of our body cell with only 10 microns in average diameter. For our long DNA to fit in the constrained area, it wraps itself to form nucleosomes which look like a string of beads. This string is 1.5 times 'pi' shorter than our DNA. Another place where 'pi' is found is in the spiral of the DNA double
 helix. The ladder like structure of the DNA helix is held together by Pi bonds. These Pi bonds are stacking interactions that help to keep the structure in place.


## FOCUS



## RUSHIK DHARAIYA <br> HOD - Mathematics <br> Podar Int School, Ahmedabad

"Playing with dates \& numbers,
It helps, if everyone remembers."

Mathematics is always a difficult area for many students. It was the same for me too when I can young. One should never apprehensive and cultivate the nice habit of playing with numbers. Why people think that numbers, theorems and proofs are very crucial to understand or remember for long? Due to bounds, restrictions and limited learning capacity? Is it? Let's try to understand it. The most common reason for people having that reluctance or tendency is the way how one has learnt or looked at the numbers, theorems etc.

This article is an attempt to alter the people's mindset and perspective towards learning numbers, theorems etc. It will help an individual to look at the beauty of numbers, dates etc., not only a few but almost all.

So, come-on let's begin, unanimously and do maintain the faith both in yourself and on 'the king subject', remember nothing is impossible under the sun!

This article will help to know about interesting facts, properties \& relationship between the numbers, theorems, dates etc. Following are some important concepts which will help us to understand date wise specialties of numbers:

## SOME IMPORTANT DEFINITIONS:

PRIME NUMBER: A number is said to be a prime number if it has only two distinct factors. e.g, 2,3,5,7,etc. There are infinitely many primes.

EMIRP NUMBER: A prime number when written in reverse order, gives a new prime number. e.g, 13 is a prime \& reversing its digits we get 31 , which is a new prime so 13 is an emirp number and vise a versa.

SEMIPRIME NUMBER: A number is said to be a semiprime if it can be expressed as a product of two distinct primes only. e.g, The number 6 can be written as $6=2 \times 3$. The number 15 can be written as $15=3 \times 5$ etc. Thus, 6 and 15 are few examples of semiprimes.

PALINDROMIC NUMBER: A number is said to be a palindromic number if the number remains same when written in reverse order. e.g, 11, 101, 111, 121, 2332 etc. There are infinitely many palindromic numbers.

ADDITIVE PRIME: A prime number is said to be an additive prime if the sum of its digits is

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again a prime. e.g, 23 is an additive prime as sum of the digits of $23(2+3=5)$ is again a prime.
(vi) Pythagorean Prime: A prime number is said to be a Pythagorean prime if it is of the form $4 k+1$, and which can be expressed as a sum of two perfect squares. e.g, $5,13,17$ etc. As $5=2^{2}+1^{2}$, $13=2^{2}+3^{2}$ and so on.

Now let's try to understand, with the help of following two examples of (say)10th March \& 12th March, 2021; how these concepts are magically and mathematically connected with the month of March!

## SPECIALTY OF 10TH MARCH, 2021: 10321

## $10=3^{2}+1$

To approach number 10, the square of 3 is added with 1, where '10' represents the date \& '3' represent the number of the month March as per the Gregorian calendar. Also, we can observe that in this process all the digits of 10321 are only used.

## $10^{2}-3^{1}(=97), 10^{2}+3^{1}(=103)$ AND $10^{2}+1^{3}(=101)$.

 ALL ARE PRIMES.Here the month number ' 3 ' is subtracted and added with the square of the date '10' and the resulting numbers 97,103 \& 101 are having only two distinct factors, which makes them special numbers called prime numbers.

## $103+21=124$

$124=5+7+11+13+17+19+23+29$, which is sum of 8 consecutive primes starting from 5

## 103-21=82=2×41

Here the year component '21' is subtracted from the composition of date \& month components i.e. '103' to get answer 82, which can be

## Specialty of 12th March, 2021: 12321

## 12321=(111) ${ }^{2}$ is a palindrome

All the three components namely date, month \& year, together forms a palindrome number 12321, which when written in reverse order gives the same number. Also 12321 is a perfect square of another palindrome number 111.

## 12321=(123-12) $)^{2}$

Here it is again interesting to see that 12321 is a perfect square of the difference of composition of date \& month components(i.e. 123) with the reverse of the year component(i.e. 12)

## $123+21=144=12^{2}$

Another interesting thing is that the composition of date \& month components(i.e. 123) added with the year component(i.e. 21) gives the square of date component(i.e. $12^{2}$ )

## 12=3!×2!×1!

Date component(12) is a product of three consecutive factorial namely $3!, 2$ ! \& 1!, where factorial of any number represents the product of consecutive natural numbers starting from 1 upto that number. e.g. $3!=3 \times 2 \times 1,2!=2 \times 1$ etc.
$12^{3}+1^{2}=1729$ which is Hardy Ramanujan number, one of the non-trivial number too.
Non-trivial number means when it's digits are added and the answer is multiplied with the reverse of that answer, gives the original number. e.g. for $1729,1+7+2+9=19$, which if we multiply with its reverse i.e 91 then we get 1729 back. ( $19 \times 91=1729$ )
$12^{3}-1^{2}=1727=11 \times 157$, so a semiprime
$12 \times 3=36$ \& $21 \times 3=63$.
Product of date component (12) with month component (3) is 36 \& the product of reverse of the date component (21) with the month component (3) is 63 and if we combine them, we get 3663 or 6336 which are palindrome nos.
expressed as a product of two distinct primes '2' and '41', this special property of having only two distinct prime factors, makes 82 a semiprime.

## 10² $\mathbf{2 1}=\mathbf{9 7 9}$, ALSO 979 = 11×89, SO IT IS A SEMIPRIME.

Here year component ' 21 ' is subtracted from the date's cube i.e. $10^{3}$ to get 979 as the answer. 979 is a number which when written in reverse order, still it remains the same i.e. 979. This property is making 979 a palindromic number. Also 979 has only 4 factors $1,11,89 \& 979,1$ and 89 are of the form $4 k+1 \&$ the others are of $4 \mathrm{k}+3$.
$\mathbf{1 0}^{\mathbf{3}} \mathbf{+ 2 1 = 1 0 2 1}$
Here to approach the number 1021 which is a combination of date \& year components, cube of date \& the year components are added. 1021 is a prime, in fact an Emirp too, as the reverse of 1021 is 1201, which is also a prime.

## 10321 IS A PRIME NUMBER, IT IS AN EMIRP TOO.

Date, Month \& Year components when taken all together forms a prime and also an Emirp, as the mirror number or reverse of 10321 is 12301 which is a new prime.

## 10321 IS AN ADDITIVE PRIME

The sum of the digits of date, month and year components i.e. $1+0+3+2+1=7 \& 7$ is a prime too, so this property of sum of digits of a prime number to be a prime again is called an additive prime.

## $10321=95^{\mathbf{2}} \mathbf{+ 3 6}{ }^{\mathbf{2}}$, A SUM OF TWO PERFECT SQUARES.

Here the number 10321 is expressed as a sum of two different perfect squares, so it is called a Pythagorean prime.

## CONCLUSION:

Thus, Math concepts indeed are connected with each and every number \& each and every day if we look at them in that way. The purpose of this 'MATHOPINION' column in this issue was to encourage readers towards Mathematics as well as to make them feel confident in the subject.
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# THEMATIC SPECIALS INTERESTING FACTS AND INFORMATION 

## FOCUS

THE MUST-KNOW ADDITIONAL INFORMATION RELATED TO THE THEME OF THE ISSUE

## 'PI’ DAY CELEBRATED WORLDWIDE AS ‘INTERNATIONAL MATHEMATICS DAY’

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## INTRODUCTION

'March 14 ' - is the day when 'International Day of Mathematics' is celebrated in entire world every year. The day was recognized by UNESCO (United Nations Educational, Scientific and Cultural Organization) during its general conference in 2019. Before this, the day was marked as 'PI DAY'.


## WHY IT IS CALLED A ‘PI-DAY’?

This day was very first celebrated in 1988 in the remembrance of the Physicist Larry Shaw. MM/DD format of $14^{\text {th }}$ March is $3 / 14.3,1$ and 4 in that order makes the first three digits used in the value of 'pi' i.e., 3.14.

## THE THEME OF THE INTERNATIONAL DAY OF MATHEMATICS:

Mathematics for a Better World

## HISTORY ABOUT THE CALCULATION OF THE VALUE OF ‘PI’ WITH INDIAN CONTEXT

The value of 'Pi' was first calculated by an ancient mathematician Archimedes Syracuse (287-212 BC). However, the value was officially accepted by the scientific community only after Leonhard Euler came up with the symbol of Pi in 1737. Proofs from the ancient India draws our attention to the value of 'pi' was known in 400BCE which is approximately 200 years before the times of Archimedes Syracuse. The documents regarding to 'pi' is available in 'Aryabhatiya' - the book written by Great mathematician of the classical times, during $5^{\text {th }}$ century which is almost 1200 years before Leonhard Euler.

## 'PI' APPROXIMATION DAY

'Pi' Approximation Day is observed on July 22 ( $22 / 7$ in the day/month format). fraction $22 / 7$ is a common approximation of $\pi$, which is accurate to two decimal places of the value of 'pi'.

## TAU DAY

## INDEX

Two Pi Day, also known as Tau Day for the mathematical constant Tau, is observed on June 28 (6/28 in the month/day format). June 28 is "Two Pi Day", also known as "Tau Day". $2 \pi$, also known by the Greek letter tau $(\tau)$ is a common multiple in mathematical formulae.

## CELEBRATIONS OF 'PI DAY'

Math-enthusiasts generally organize 'Pi' recital competitions, various workshops based on the theme of 'pi', extempore competitions etc. Many people also conduct sessions wherein they try to inculcate young students' interest in mathematics by playing interactive games, worksheets, among other events. Many adults also take a keen interest in these workshops to keep their love for the subject alive. In 1988, the earliest known official or large-scale celebration of Pi Day was organized by Larry Shaw at the San Francisco Exploratorium, where Shaw worked as a physicist, with staff and public marching around one of its circular spaces, then consuming fruit pies. The Exploratorium continues to hold Pi Day celebrations. The entire month of March 2014 (3/14) was observed by some as "Pi Month". In the year 2015, March 14 was celebrated as "Super Pi Day". It had special significance, as the date is written as 3/14/15 in month/day/year format. At 9:26:53, the date and time together represented the first 10 digits of л.

## MUST KNOW FACTS ABOUT 'P1'

1. Pi day was first recognized 30 years ago in 1988 by Physicist Larry Shaw.
2. Stephen Hawking died on this day on 2018.
3. Albert Einstein was born on Pi Day in 1879.
4. 'Pi' is basically an irrational number.
5. Exact value of 'pi' is not 3.14 but, it is $3.1428 .$. So, 3.14 is the approximate value of 'pi'.
6. Pi is the ratio of a circle's circumference to its diameter, commonly approximated as 3.14159.
7. The decimal value of Pi goes on. It never stops or repeats.
8. The mirror image of 3.14 reads PIE
9. A circle has an infinite number of corners calculated with the help of Pi.
10. There is an entire language made from Pi. In 2010, software engineer Michael Keith published a book names 'Not a Wake' in Pi language.
11. In Greek alphabets, Pi is the sixteenth letter and in English also p is the sixteenth letter.
12. In the 19th century, William Shanks calculated the first 707 digits of Pi by hand but unfortunately, he made a mistake after 527th place.
13. Pi is an irrational number that is it is not possible to calculate Pi by dividing an integer by any other number.
14. 'Pi' is known as other names i.e., Ludolph's Number, Archimedes constant, Circular constant, etc.

## MATH-MANTRA

## FOCUS

# MATH-MANTRA QUIZ\#8 

CLICK HERE TO ATTEMPT QUIZ \#8 MATH-MANTRA QUIZ _ MARCH2021 GRAB THE CHANCE TO SECURE YOUR NAME IN THE VMW-HALL OF FAME

## INSTRUCTIONS FOR Q1 TO Q5:

Answer the question based on the information given below.
[નીચે આપેલી માહિતીના આધારે સવાલનો જવાબ આપો.]
$A, B, C, D, E, F$ and $G$ are sitting on a bench in a row and all of them are facing east. $C$ is to the immediate right of $D$, but not next to $F$. $B$ is at the extreme end and has $E$ as his neighbour. $G$ is between $E$ and $F$. $D$ is sitting third from the south end.
A, B, C, D, E, F અને G સળંગ બેંચ પર બેઠા છે અને તે બધા પૂર્વ તરફ છે.C એ D ની તાક્કાલિક જમણી બાજુ છે, પરંતુ F ની બાજુમાં નથી. B બેંચ ના એક ખૂણા પર છે અને એ તેનો પડોશી છે. G E અને F ની વચ્ચે છે. D દક્ષિણ છેડેથી ત્રીજા સ્થાને છે.

1. Who is sitting to the immediate right of E ?
[E ની તાત્કાલિક જમણી બાજુ કોણ બેઠું છે?]
(A)C
(B) D
(C)G
2. Which of the following pairs is sitting at the extreme ends?
[નીચેનામાંથી કઈ જોડી આત્યંતિક છેડે બેઠા છે?]
(A) A, B
(B)A,E
(C) $C, B$
3. The person sitting third from the north end is?
[ઉત્તર છેડેથી ત્રીજી બેઠી વ્યક્તિ કોણ છે?]
(A)E
(B)F
(C)G
4. Between Which of the following pairs is D sitting? [નીચેના માંથી કઈ જોડી વચ્ચે ડી બેઠો છે?]
(A) A, F
(B) $C, E$
(C) $\mathrm{C}, \mathrm{F}$
5. Which mathematician invented the binary method?
[કયા ગણિતશાસ્ત્રી એ બાઈનરી પદ્ધતિની શોધ કરી હતી]
(A) Acharya Pingala (આચાર્ય પિંગળા)
(B) Varahamihira (વરાહમિહિર)
(C) Brahmagupta (બ્રહ્મ ગુપ્ત)
6. Which day is Pie Day celebrated? [કયા દિવસે પાઈ દિવસ ની ઉજવણી થાય છે]
(A) $15^{\text {th }}$ March
(B) $14^{\text {th }}$ March
(C) $13^{\text {th }}$ March
7. Who recited 70,000 decimal places of pi on March 21, 2015 and got a place in Guinness World Records?
[કોણે 21 માર્ચ, 2015 ના રોજ પાઇના 70,000 દશાંશ સ્થાનો યાદ રાખીને બોલ્યા કે જેથી તેમણે ગિનીસ વર્લ્ડ રેકોર્ડમાં સ્થાન મેળવ્યું?]
(A) Ranbir Meena (રણબીર મીણા)
(B) Rajveer Meena (રાજવીર મીણા)
(C) Rajendra Meena (રાજેન્દ્ર મીણા)
8. The world's first person to give the exact value of 'pi' by infinite series representation of pi is? પાઇની અનંત શ્રેણી રજૂઆત દ્વારા 'પાઈ' નું ચોક્કસ મૂલ્ય આપનાર વિશ્વના સૌ પ્રથમ વ્યક્તિ કોણ હતા?
(A) Gregory-Leibniz (ગ્રેગરી-લેઈબનિઝ)
(B) Madhava (માધવ)
(C) Aryabhata (આર્યભટ)
9. What is the curved surface area of the cone?
[શંકુનું વક્ર સપાટીનું ક્ષેત્રફળ શું છે?]
(A) $(1 / 3) \pi R 2 h$
(B) $\sqrt{ } \mathrm{R}^{2}+\mathrm{H}^{2}$
(C) $\pi \mathrm{RL}$
10. Once again Indian mathematician in news for being one of the winners of MICHAEL AND SHEILA HELD PRIZE. What is his name?
[ફરી એકવાર એક ભારતીય ગણિતશાસ્ત્રી 'મિશેલ અને શીલા હેલ્ડ પ્રાઇઝ'ના વિજેતા બનવાથી સમાચારમાં છે. તેમનું નામ શું છે?]
(A) Nikhil Shrivastav (નિખિલ શ્રીવાસ્તવ)
(B) Rajveer Meena (રાજવીર મીણા)
(C) None of them (આમાંથી કોઈ નહિ)

# VMW - Hall of Fame recognizing the winners of the contests 

## ABHIK BOXI

Standard: $9^{\text {th }}$
Podar International School Ahmedabad, Gujarat


## Arun VAGHELA

Standard: $7^{\text {th }}$
Shiv Ashish school
Bopal, Gujarat


## MANASEE KALE

Standard: 6
Podar International School
Thane, Maharastra


## AMOL DALMIA

Standard: 8
Laxmipat Singhania school
Kolkata, West-Bengal


## BRIYONA SANGHVI

Standard : 10
Amrit Jyoti Highschool
Ahmedabad, Gujarat

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# READERS' SPEAK <br> FEEDBACK FROM THE READERS 

There was a very nice experience. Many times, it saved me in my exam

## INDEX

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## MANAV T. (A STUDENT)

It is a very informative magazine which creates interest among the children about mathematics.


## TWINKLE J.



Vedic Mathematics with its special features has the inbuilt potential to solve the psychological problem of Vedic Mathematics - anxiety. The Vedic Methods enable the practitioner to improve mental abilities to solve difficult problems with high speed and accuracy.
POOJA D.

I love Vedic math because I think I can learn more things here. The knowledge provided here is very helpful. I like Vedic math world most.

## NANDITA P.

This magazine is very nice, due to this magazine I learn many short tricks which is helpful in my sums. It is help us in various methods. We can do any calculation quickly due to this class.

## PARVATI R.

Students who interested in maths can learn to solve problems, sudoku and other kind of logical problems. They can also learn smart and short tricks. It enhances the knowledge related to math.
NISHA B.


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## PUZZLE

SUDOKU TIME!
SUDOKU PUZZLE \& MUST-KNOW FACTS!

The solution to this sudoku puzzle will be featured in the next issue of 'Vedic Math World' in April2021. Try to solve this puzzle. A Sudoku puzzle consists of 81 cells which are divided into nine columns, rows and regions. The task is now to place the numbers from 1 to 9 into the empty cells in such a way that in every row, column and $3 \times 3$ region each number appears only once.

|  | 3 |  | 1 |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 1 |  |  |  |  | 9 |  |  |  |
|  |  |  |  |  |  |  | 1 |  |
|  | 9 |  |  |  |  |  |  |  |
| 5 |  |  |  | 3 |  |  |  |  |
|  |  |  |  |  |  |  |  | 9 |
|  |  | 5 |  |  |  | 6 |  |  |
| 9 |  | 1 |  |  |  | 3 |  | 5 |



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# चल्गोइ 

