CONTINUUM

The Annual Magazine
Department of Mathematics
Bharati College

2023-24

VOLUME 1

@_exponents_

MAGAZINE'S THEME

SANKHYA '24

Language

Mathematics

From Desk of PRINCIPAL

Dear Students and Faculty Members,

It brings me great pleasure to congratulate you on the inaugural issue of our Mathematics department magazine. As we start on this exciting journey together, I am filled with optimism and enthusiasm for the boundless possibilities that lie ahead.

I encourage each of you to embrace the challenge of diving deep into the world of numbers and equations. Let us approach mathematics not as a daunting task but as a captivating adventure, one that stimulates our brains and keeps them fertile with new ideas and insights. Mathematics is not just an academic pursuit; it is a mental workout that enhances cognitive abilities and fosters critical thinking skills.

As members of this esteemed department, we bear a special responsibility to not only hone our own quantitative aptitude but also to extend a helping hand to others in developing theirs. Let us embody the spirit of collaboration and mentorship, creating an environment where every student feels empowered to excel in mathematics. Whether through peer tutoring, study groups, or organized workshops, let us cultivate a culture of mutual support and encouragement.

As we start on this journey together, I am confident that our dedication to the beauty of numbers will allow our minds to soar to new heights of understanding and creativity. Let us embrace this journey with open hearts and eager minds, knowing that the possibilities are limitless and the rewards immeasurable.

I extend my heartfelt gratitude to all who have contributed to the creation of this magazine and look forward to witnessing the continued growth and success of our Mathematics department.

Warm regards.

Message From
TEACHER-IN-CHARGE

Dear Students and Faculty,

I want to take a moment to extend my heartfelt wishes for the well-being of our entire department. Each one of you plays an integral role in shaping the educational journey and contributing to the success of our department. Your dedication, passion, and commitment are truly commendable, and I am grateful to have the privilege of working alongside such a talented and compassionate team. I am proud to see the growth the steps that are taken and achievements of our department.

It gives me immense pleasure to introduce our department's first Magazine "Continuum".Within the pages of this magazine, you will find an intellectual blend of art and knowledge, poetries, insightful articles, and thought-provoking essays that beautifully highlight the diversity of perspectives and expertise within our department.

I extend my heartfelt gratitude to the talented entrepreneurial aptitude of our department and contributors whose dedication has made this magazine possible. I would like to express my sincere appreciation to the editorial team for their meticulous efforts in bringing these pages to life.

My best wishes to you all!

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BHARATI COLLEGE

न हि ज्ञानेन सदृशं पवित्रमिह विद्यते।।

Nothing in this world is more sacred than knowledge.

Bharati College, originally known as Bharati Mahila College, was established in 1971 by the Delhi Administration, embodying the essence of Goddess Saraswati, the patron of academics and arts. Initially housed in a Government Senior Secondary School for Boys, it prioritized women's education and empowerment. Over the years, it evolved into a premier institution, fostering a nurturing environment for holistic development.

Nestled in the heart of Delhi, adjacent to cultural landmarks like Naaz Cinema and Mata Ka Mandir, the college soon became synonymous with its vibrant surroundings, earning the moniker 'Pahariwala College'. Despite initial constraints, with modest student and staff numbers and shared premises, its dedication to excellence remained unwavering.

Throughout its history, Bharati College has remained committed to fostering social responsibility and academic excellence, nurturing generations of empowered women poised to make significant contributions to society.

THE EXPONENTS

DEPARTMENT OF MATHEMATICS

BHARATI COLLEGE

In the annals of academic ambition, Exponents emerged as a beacon of brilliance in the realm of mathematical prowess, ignited by the inaugural cohort of the Mathematics Department in 2017. With 80-90 vibrant minds, brimming with zeal and youthful vigor, they embarked on a transformative odyssey of intellectual exploration, eager to traverse uncharted territories.

Amidst the anticipation of a collegiate extravaganza, Dr. Anubha Ma'am unveiled tantalizing prospects, sparking Exponents' genesis. Undeterred by the absence of a dedicated society, they rallied resources, forging alliances with the Department of Commerce for a collaborative symphony of scholarly celebration. Fueled by passion and fortified by collaboration, they resolved to co-host a fest, seeking counsel from Commerce seniors to strategize an impactful presence, thus laying the groundwork for their remarkable journey.

The establishment of the society, led by Himanshi Bhatia as president and Lisha Arora as Vice President, marked the first decisive step for "Exponents: Full of Power," symbolizing their boundless potential. Despite obstacles, they organized a series of engaging events, from mathematics quizzes to enlightening seminars, culminating in the triumphant inauguration of "Math-o-pedia." Today, Exponents' achievements serve as a testament to the dedication of their predecessors, inspiring future generations with the transformative power of vision and perseverance.

The laurels of Exponents today are a result of their predecessors' herculean efforts, representing the transformative power of collective endeavor.

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THANK YOU TEAM

OUR DEPARTMENT

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UNION MEMBERS

1st Year















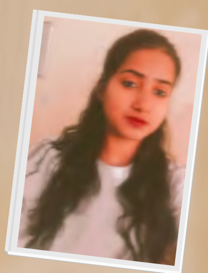
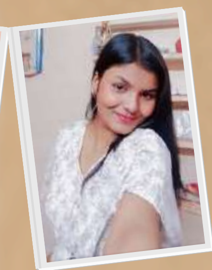
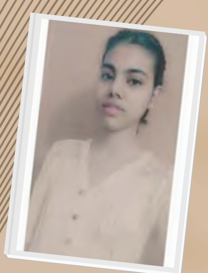












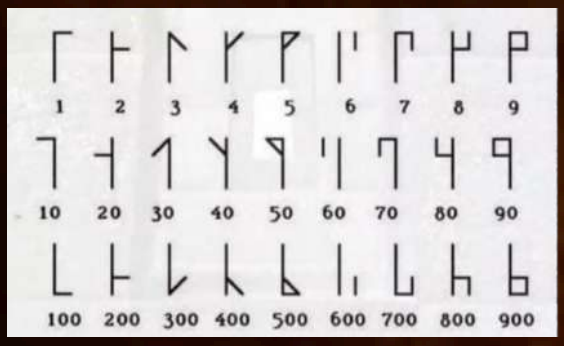

2nd Year

3rd Year

Mathematics Through Ages

HAVE YOU EVER WONDER HOW PEOPLE IN LITHIC AGES DID COUNTING OR HOW WILL THEY KEEP RECORD OF THEIR ACTIVITIES LIKE HOW MANY ANIMALS THEY HUNT IN A DAY?
WELL THERE ARE SOME EVIDENCES OF IT THROUGH WHICH WE CAN FIND OUT HOW THEY DID COUNT.

THEY USE DIFFERENT SYMBOLS. FOR EXAMPLE:-



IT WAS QUITE TOUGH TO REMEMBER TO MANY SYMBOLS..

AS HUMANS EVOLVE THEY FOUND A WAY TO COPE UP WITH THIS PROBLEM.

THIS IS THE EVIDENCE OF THE USE OF MATHEMATICS WAS FOUND IN TWO SMALL BONES FROM AFRICA, WHICH ARE 8000 TO 20,000 YEARS OLD.
FOR EXAMPLE IF A MAN HUNTED 10 ANIMALS IN A DAY TO KEEP RECORD OF THIS HE DRAW 10 LINES ON STONE

|||||||||| = 10

BUT IF NUMBER OF ANIMALS INCREASED TO 50 IT WAS A BIT TOUGH TO DRAW 50 LINES. FOR THIS THEY MIGHT USE DIFFERENT SIGN FOR EXAMPLE:-

|||||||||| = 10 = #

= 50

SO THEY WERE USE DIFFERENT SYMBOLS TO WRITE
10=#
100=$ AND SO ON..

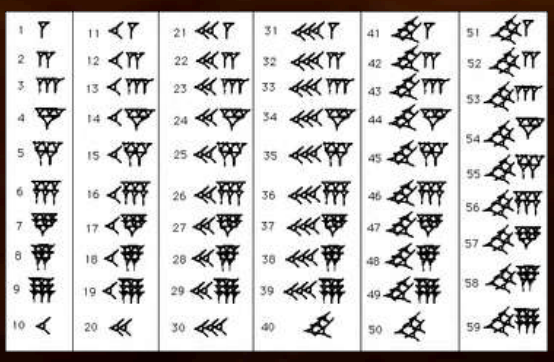
567 WRITTEN AS $$$$$######|||||||.

BUT WHAT IF NUMBER INCREASES TO 4231789. NOW IT IS MORE COMPLICATED TO DRAW AND AS NUMBER INCREASES THERE WAS NEED OF MORE SYMBOLS. THIS GIVE BIRTH TO SIGN VALUE SYSTEM AND THE FAMOUS SIGN VALUE SYSTEM ARE BABYLONIAN AND ROMAN NUMERAL SYSTEM.

Babylonian System

A SEXAGESIMAL(BASE-60) BABYLONIAN NUMERAL SYSTEM IS AN ANCIENT NUMERAL SYSTEM THAT ORIGINATED IN MESOPOTAMIA AROUND 3000 BCE AND WAS USED BY THE BABYLONIANS AND OTHER CULTURES OF THE REGION.

IN THIS SYSTEM NUMBERS WAS REPRESENTED BY USING A COMBINATION OF TWO SYMBOLS:-
HORIZONTAL WEDGE- REPRESENT TEN
VERTICAL WEDGE- REPRESENT ONE



जैसे मोरों में शिखा और नागों में मणि का स्थान सबसे ऊपर हैं , वैसे ही वेदांग और शास्त्रों में गणित का स्थान सबसे ऊपर है.

Roman Numeral

ROMAN NUMERAL SYSTEM WAS ORIGINATED IN ANCIENT ROME AND USED THROUGHOUT THE ROMAN EMPIRE. IN THIS NUMBERS ARE REPRESENTED BY LETTERS OF THE ALPHABETS SUCH AS.

1	I	14	XIV	27	XXVII	150	CL
2	II	15	XV	28	XXVIII	200	CC
3	III	16	XVI	29	XXIX	300	CCC
4	IV	17	XVII	30	XXX	400	CD
5	V	18	XVIII	31	XXXI	500	D
6	VI	19	XIX	40	XL	600	DC
7	VII	20	XX	50	L	700	DCC
8	VIII	21	XXI	60	LX	800	DCCC
9	IX	22	XXII	70	LXX	900	CM
10	X	23	XXIII	80	LXXX	1000	M
11	XI	24	XXIV	90	XC	1600	MDC
12	XII	25	XXV	100	C	1700	MDCC
13	XIII	26	XXVI	101	CI	1900	MCM

AND FOR LARGER NUMBERS THEY STARTED USING BAR OVER LETTERS.

V = 5 — $\overline{V}$ = 5000
X = 10 — $\overline{X}$ = 10000
L = 50 — $\overline{L}$ = 50000
C = 100 — $\overline{C}$ = 100000
D = 500 — $\overline{D}$ = 500000
M = 1000 — $\overline{M}$ = 1000000

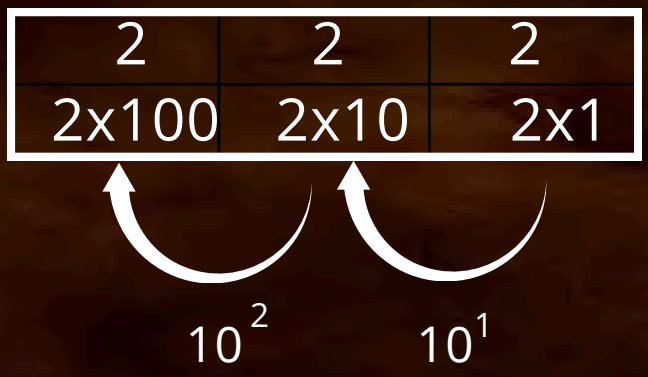
IT IS A NON POSITIONAL NUMERAL SYSTEM, i.e EACH SYMBOL HAS ITS UNIQUE VALUE AND ITS VALUE DOES NOT DEPEND ON ITS POSITION.
THIS SYSTEM IS NOT EXTENSIVELY USED IN MODERN TIMES FOR CALCULATIONS BUT IT IS A GREAT IISPIRATION BEHIND THE EVOLUTION OF PLACE VALUE SYSTEM.

Place Value System

IT IS ALSO KNOWN AS HINDU-ARABIC NUMERAL SYSTEM. THE INDIANS ARE CREDITED WITH THE INVENTION OF ZERO AND OTHER SYMBOLS USED IN THIS SYSTEM WHICH REVOLUTIONISED MATHEMATICS BY MAKING CALCULATIONS EASIER.
THIS IS A BASE-10 NUMERAL SYSTEM CONSISTS OF 10 DIGITS 0 1 2 3 4 5 6 7 8 9 . THE WORD DIGIT COMES FROM LATIN WORD DIGITORUM FOR FINGERS, THIS SYSTEM WAS DEVELOPED FROM COUNTING ON 10 FINGERS.
THIS IS POSITIONAL SYSTEM IN WHICH THE VALUE OF DIGIT DEPENDS ON ITS POSITION.
FOR EXAMPLE 222- TWO HUNDRED TWENTY TWO
HERE WE HAVE DIGIT 2 IN ALL THREE PLACES BUT ACCORDING TO THE POSITION OF 2 ITS VALUE IS CHANGING.

222

TWO HUNDRED TWENTY TWO



FROM UNIT DIGIT MOVING ONE PLACE TO THE LEFT MULTIPLIES THE VALUE BY 10 AND MOVING ONE PLACE TO THE RIGHT DIVIDES THE VALUE BY 10.

इमा मेऽअग्नऽइष्टका धेनवः सन्त्वेका च सहस्रञ्चायुतञ्चायुतञ्च नियुतञ्च नियुतञ्च प्रयुतञ्चार्बुदञ्च न्यर्बुदञ्च समुद्रस्य मध्यञ्चान्तश्च परार्धश्चौता मेऽअग्नऽइष्टका धेनवः सन्त्वमुत्रामुष्मिल्लोके।।

यजुर्वेद अध्याय 17 श्लोक 2

1= एका

10= दश

100= शत

1000= सहस्त्र

10000= अयुतम

100000= नियुतम

1000000= प्रयुतम

10000000= अब्रुदम

100000000= न्यब्रुदम

1000000000= खर्रब

10000000000= निखर्रब

100000000000= महापद्म

1000000000000= शंख

10000000000000= समुद्र

100000000000000= मध्यं

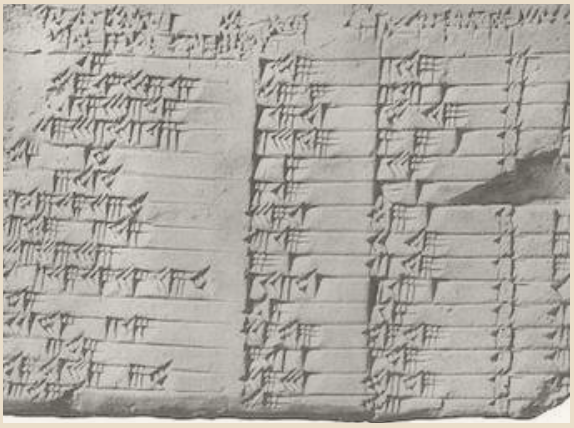
1000000000000000= अंत

10000000000000000= परार्ध

MATHEMATICAL MARVELS

"Exploring the Origin and Symbolisim of Mathematics"

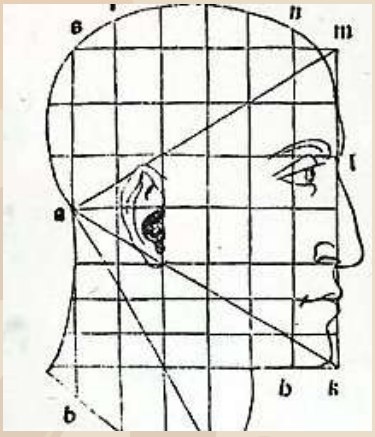
ANCIENT NUMERICAL SYSTEM



Johnny bedroom time to explore the version of numerical system in ancient civilization such as Mesopotamia, Egypt,and India. Discovering the innovative method early mathematician used to represent a quantities and performed the calculation line the ground work for modern arithmetic and algebraic techniques that continue to shape of understanding of the word.

MATHEMATICS IN ART AND CULTURE

Mathematics is art and culture explode the profound infection between mathematical principle and creative expression from the intricate geometric patterns adorning ancient architecture harmonious properties found in classical art mathematics of fundamental element in artistic endeavours across cultural and epochs.



Artist throughout history from Renaissance master to modern creator have draw inspiration from mathematical concept such as symmetry fractals and golden ratio to create a work of timeless beauty and significance. Throughout the length of magnetic art become the medium of exploring extract concept and conveying universal truth fortering a appreciation for inherent connections between creativity and logic.

MATHEMATICAL OUTLOOK

Solving mathematics problems is like creating a circle...because it never ends! - Nikita

It's a language which basically governs universe, the issue is the gap because all that we study , we cannot relate it even though it is there.. -Namita

IMPORTANCE OF MATHEMATICS CAN'T BE DEFINED IN SMALLER QUOTATIONS IT REQUIRES A LOT OF UNDERSTANDING .
-PRIYANSHI SINHA

Life was easy when we had to find the value of x. Now we have to struggle to find the name of the mathematics subject, chapter, and understanding the basics. And before this happens, the semester is over! - Himanshi

It's a Playground because it's easy to play with numbers -Dr.Ankit Gupta

Honeymoon phase till you're not aware of calculas,
"The Calculas final boss of maths"
Lim f(x)= i+hate= maths
You-> anxiety
Next phase quit or die -Jatin

"MATHS" stands for "Meri Aatma Tujhe Hamesha Satayegi". I've not sold my last semester maths book as I'm not sure whether I passed the last exam or not. -Sejal Jha

POWERFUL,GIVES CONFIDENCE AND DEMOTIVATES WITHIN A SPAN OF SECONDS,THRILLING
-IPSHITA SINGH

"Newton once said that God must have been a great mathematician because only a mathematician could have created the world in a systematic manner.
Being a mathematics student and teacher, this statement of Newton seems to me to be completely true.Mathematics definitely teaches us to live life in a systematic way. Ofcourse, its direct effect is not visible in our life but indirectly it is definitely a part of our life. Mathematics is not just playing with numbers; Mathematics is a path to spirituality; Whoever chose the path of spirituality chose mathematics as their path."

by
Ashok Daksh

Beyond Limits: A Journey Through the Concept of Infinity

Have you ever wondered how many numbers there are between 0 and 1? Despite its apparent simplicity, this question leads us to some of the most fascinating and perplexing concepts of mathematics , infinity, the limitations of human comprehension.

So , what is Infinity ? Is infinity only a concept? A weird idea that mathematicians play with? Or does it have a connection with the world around us? Is anything really infinite?

In mathematics , infinity is a state of endlessness or having no limits in terms of time, space, or other quantity.

Infinity is not a number, but rather a mathematical idea that is used to represent the concept of something that goes on indefinitely without ever reaching a limit or endpoint.So , basically **What one can tell you is what infinite is and not what is Infinity**

As Aristotle said: "Nor does this account of infinity rob the mathematicians of their study; for all that it denies is the actual existence of anything so great that you can never get to the end of it.

Limitless Horizons : Exploring the Infinity

A common person may perceive infinity as a never-ending sequence of numbers or events. For example, they may imagine counting from 1 to infinity as an infinite process that continues forever without ever reaching a final number. However, this perception of infinity is not entirely accurate from a mathematical standpoint. In mathematics, infinity is not a number or a quantity, but rather a concept that represents the absence of a finite limit.

The concept of infinity has been the subject of philosophical and mathematical inquiry for thousands of years. However, there is no mathematical proof for the existence of infinity in the sense of a physical quantity that can be measured or observed. Instead, it's a mathematical idea to help us to describe certain phenomena , such as the behaviour of certain functions. Even though there are certain mathematical systems like calculus and set theory which deal with the idea of infinity. Still, the **existence of infinity as a mathematical concept is generally accepted as an axiom or a postulate, rather than something that can be proven or disproven mathematically.**

Why are we so intrigued by the infinite? Maybe it's because of the tension between our finite lives and the seemingly unbounded range of our imagination, between the limits that we experience and the possibly infinite universe that we inhabit.

The concept of infinity has grasped a lot of people, including me, because of its unimaginable greatness. I think that the infinite does play a huge role in our lives but to get that we need to approach the infinite in a certain way.. The question still remains where this infinite process heads towards. As many intelligent people have mentioned before me; life is a music piece that is not really heading somewhere, it is the process of life itself that makes it beautiful. Similarly I think that infinity is more of a process than an actual outcome.In our lives, there is no real infinity present, but I believe there is always a desire towards reaching infinity

वैदिक गणित

वेदों की ऋचाएं भारत मे, जब घर-घर गूँजा करती थीं।
चहुं दिशि तेज प्रकाशित तब, हर ओर उन्नति होती थी॥1॥

वही ऋचाएं गणित-सूत्र , मानव को कुछ बतलाती हैं।
जीवन में क्या-कब करना है, सब सरल रूप समझाती हैं॥2॥

सभी कलाएं जीवन में सम्भव, खुद ही आ जाती हैं।
बुद्धि में ज्ञान प्रकाशित हो, जब निकट गणित को पाती है॥3॥

ज्योतिष भी अंग गणित का है, सब कुछ पहले बतलाता है।
ले जन्म धरा पर आते ही, साक्षी निर्णय हो जाता है॥4॥

शून्य-दशमलव मिले तभी, दर्शिका गणित की किरन बनी।
निर्भय हो पथ पर कदम बढ़ें, प्रभु-पद-पंकज हो प्रीत घनी॥5॥

-Sakshi
B.Sc.(H)Mathematics
3rd year
Bharati College

Language of Mathematics

In the realm where numbers speak,
Equations form, patterns peak.

Symbols dance and numbers rhyme,
Mathematics stands the test of time.

Algebra, geometry, and more,
In the language of math, we explore.

From the simple to the complex,
Mathematics, we can't perplex.

So let us embrace this numerical art,
For in the language of math, we find our part.

A world of logic, beauty, and grace,
Mathematics, in every space

-Raj Maurya
B.Sc.(H)Mathematics
2nd year
Rajdhani college

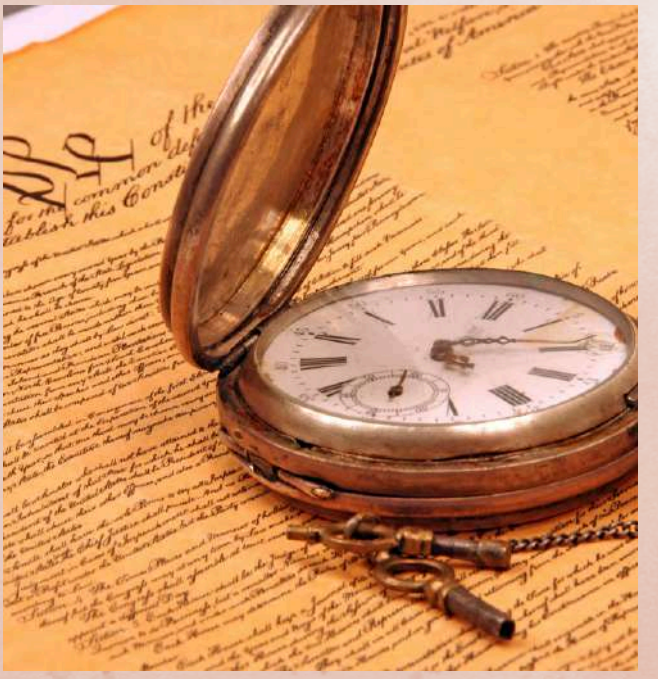
GENERAL *LEIBNIZ* RULE

Mathematics without natural history is sterile, but natural history without mathematics is muddled.

-John Maynard Smith

India is a nation full of assets for all the corners of the world. It has immensely contributed to fields like arts, science, literature, mathematics and many different disciplines.

Such is the example of one of the most popular theorems of our mathemagical world - THE LIEBNIZ THEOREM by sir Gottfried Wilhelm Leibniz of Leipzig, Germany. The Leibniz theorem states that if



f and g are n-times differentiable functions, then the product fg is also n-times differentiable and its nth derivative is given by

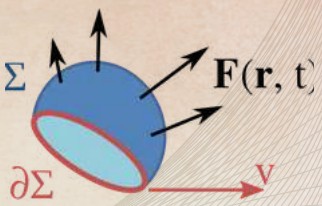
In calculas, the general Leibniz rule, named after Gottafried Wilhelm Leibniz, generalises the product rule (which is also known as "Leibniz's rule"). It states that if f and g are n-times differentiable functions, then the product fgis also n-times differentiable and its nth derivative is given by

$$(fg)^{(n)} = \sum_{k=0}^{n} \binom{n}{k} f^{(n-k)} g^{(k)},$$

where $\binom{n}{k} = \frac{n!}{k!(n-k)!}$ is the binomial coefficient and $f^{(j)}$ denotes the *j*th derivative of *f* (and in particular $f^{(0)} = f$).

However, this theorem was already given by our great mathematician **Sir Madhava of Sangamagrama** (c. 1350 – c. 1425) or his followers in the Kerala school of astronomy and mathematics in the 14th or 15th century. He was the first to use infinite series approximations for a range of trigonometric functions, which has been called the "decisive step onward from the finite procedures of ancient mathematics to treat their limit -passage to infinity."

The infinite series for π is mostly known today as the Leibniz formula for π. But few people know that this series was already discovered in India



by Madhava (c. 1340– 1425 AD) of Sangamagrama, 300 years before Leibniz or Gregory. All three series were later independently discovered in 17th century Europe. The series for arctangent was rediscovered by James Greogry in 1671 and Gottfried Liebniz in 1673,and is conventionally called Greogry's series. The specific value can be used to calculate the circle constant π and the arctangent series for 1 is conventionally called Leibniz's series.

In mathematics, a **Madhava series is one of the three Taylor series expansions for the sine, cosine, and arctangent functions** . In recognition of Madhava's priority, in recent literature these series are sometimes called the *Madhava–Newton series,Madhava–Gregory series,or Madhava–Leibniz series(among other combinations).*

No surviving works of Madhava contain explicit statements regarding the expressions which are now referred to as Madhava series. However, in the writing of later Kerala school mathematicians **Nilakantha Somayaji and Jyeshthadeva** one can find unambiguous attributions of these series to Madhava. These later works also include proofs and commentary which suggest how Madhava may have arrived at the series. This theorem used to solve calculus and integral problems ,underlying *infinite series expansions of functions, power series, trigonometric series, and rational approximations of infinite series* was actually already given by the great mind of our nation which is a matter of immense pride.

But why was his name introduced after such a long period even though he had formulated it much earlier? The undermining of the works of Indian scholars has been occurring for ages and they don't get their share in the glory. Madhava was also a prey to such incidents and still many people do not know about the addition of Madhava's name in Leibniz's theory.

To prevent such instances, the works of Indian scholars must be intensively examined and researched.

The unique thing about the series given by Madhava is that he gave this series in the form of a beautiful verse

which makes it even more interesting. And so its wise only to let go of the old name and with full sense of achievement give respect to both the greatest mathematicians .

Thus ladies and gentlemen
-THE MADHAVA-LEIBNIZ
series.

FEMALE LEGENDS IN MATHEMATICS

There are several Legendary Female Mathematician who have made ground breaking contribution to the field.

Here are few Female Mathematician and their Achievements :

Ada Lovelace was born on December 10, 1815. She is often regarded as the' world's First Computer Programmer'. She worked alongside Charles Babbage and wrote the first algorithm to be proceeded by a machine, making her a pioneer in the field of Computer Science

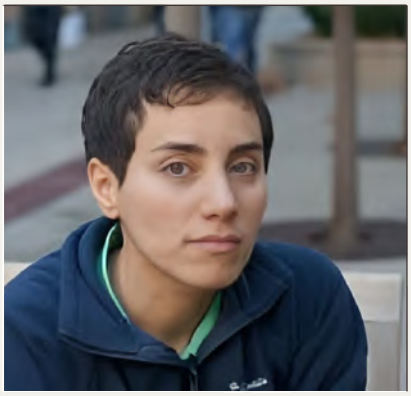
Ada Lovelace

Shakuntala Devi

Shakuntala Devi was born on November 4, 1929. She was a remarkable mathematician known for her incredible mental calculation abilities. She made significant contributions to the field and was often referred to as the "Human Computer". She holds the Guinness World Record for "Fastest Human Computation". She wrote several books on mathematical puzzles and techniques.

Raman Parimala was born on November 26, 1948. She is a renowned mathematician known for her work in Algebraic geometry and Algebraic groups. She has made significant contributions to the Theory of Quadratic forms and the study of Algebraic groups over the field.

Raman Parimala



Maryam Mirzakhani

Maryam Mirzakhani was born on May 12,1977. She was the first women to receive the Field's Medal, the highest honor in mathematics. Her research focused on the study of Complex Geometric shapes and their dynamics, particularly in the field of Hyperbolic geometry.

Sophie Germain was born on April 1,1776. She made notable contributions to Number theory and Mathematical Physics. She overcame gender barriers to pursue her passion for mathematics and made significant advancement in the study of Fermat's Last Theorem

Sophie Germain

Geetha Venkatraman

Geetha Venkatraman was born on August 29, 1967. She is a mathematician known for her work in Algebraic Topology and Homotopy theory. She has made significant contributions to understanding of Algebraic K- theory and stable Homotopy theory

A CROCODILE PARADOX

"UNDERSTANDING THE NATURE OF TRUTH AND LOGIC"

The Crocodile Paradox is a classical philosophical problem that raises questions about the nature of truth and logic.

1) Origin:
Originating from ancient Greece, the paradox is attributed to Eubulides of Miletus*,a philosopher of the Megarian school.

2)Scenario:
A man declares that he will cross a river where a crocodile lies. The paradox arises when the man asserts that the crocodile will not eat him.

3)Paradoxical Statement:
If the crocodile agrees not to eat the man, then it should let him pass safely. However, if the crocodile decides to eat the man, it would contradict the initial assertion, proving it false.

4) Dilemma:
The paradox hinges on whether the crocodile will eat the man or not. If it does, it contradicts the man's statement, but if it doesn't, it invalidates the threat of the crocodile's presence.

5)Resolution:
There is no clear resolution to the paradox, as it challenges the principles of logic and truth. It's often used to illustrate the complexities of language and logic.
In essence, the paradox revolves around the contradiction that arises when one statement'struth depends on the outcome of another statement, leading to a logical conundrum.

Reference

The Crocodile Paradox is attributed to Eubulides of Miletus, a Greek philosopher known for his paradoxes. However, it's important to note that much of what we know about Eubulides and his paradoxes comes from later sources, such as the writings of Aristotle and Diogenes Laërtius. While these references provide some insight into Eubulides and his work, scholars often debate the accuracy and authenticity of these accounts. So, while Eubulides is commonly associated with the Crocodile Paradox, the exact origins and authenticity of the attribution may be difficult to verify conclusively.

BARBER'S PARADOX

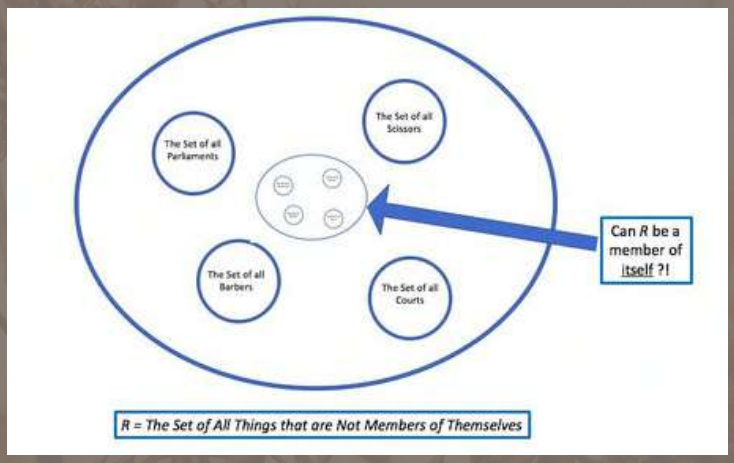
1) Barber's Description: Imagine a town with a barber who shaves all those and only those who do not shave themselves.

2) The Paradox: The question arises, does the barber shave himself?

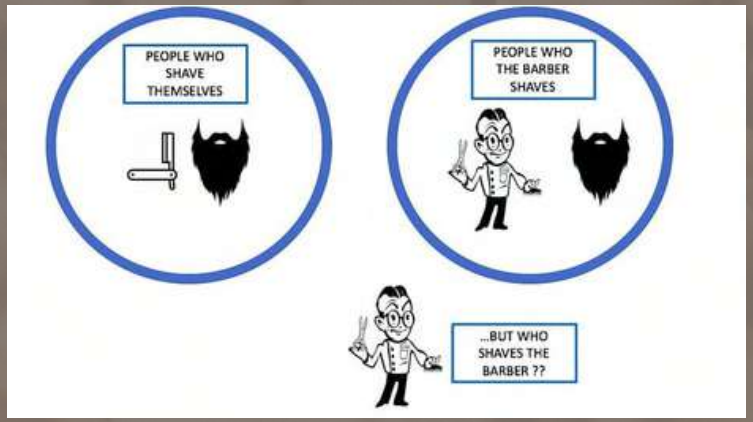
3) Contradiction: If the barber shaves himself, according to the description, he shouldn't, because he only shaves those who don't shave themselves.

4) If He Doesn't Shave Himself:
If he doesn't shave himself, according to the description, he should shave himself because he shaves all those who don't shave themselves.

5) Unresolvable Contradiction: This creates an irresolvable contradiction, leading to the paradox. The Barber Paradox highlights the complexities and limitations of self-reference and logical reasoning within certain contexts



"The Barber Paradox is a self-referential paradox that arises from a scenario involving a barber who shaves all those and only those who do not shave themselves."



Lawyer's Paradox

The Lawyer's Paradox is a classic logical puzzle that highlights a contradiction in self-referential statements.

1) The Statement: "This statement is false."

2) The Paradox: If the statement is true, then it must be false, as it claims to be false. But if it's false, then it must be true, as it is stating it's false.

3) Dilemma: It creates a paradoxical loop where neither truth nor falsehood can be assigned to the statement.

4) Implications: This paradox challenges the principles of classical logic and raises questions about the nature of truth and self-reference.

Example:-

Defending a Confessed Criminal: A lawyer is appointed to defend a client who has confessed to committing a crime. Despite knowing the client's guilt, the lawyer is ethically bound to provide the best defense possible.

RUSSELL'S PARADOX

The Russell Paradox is a famous logical paradox discovered by the philosopher and mathematician Bertrand Russell in 1901.

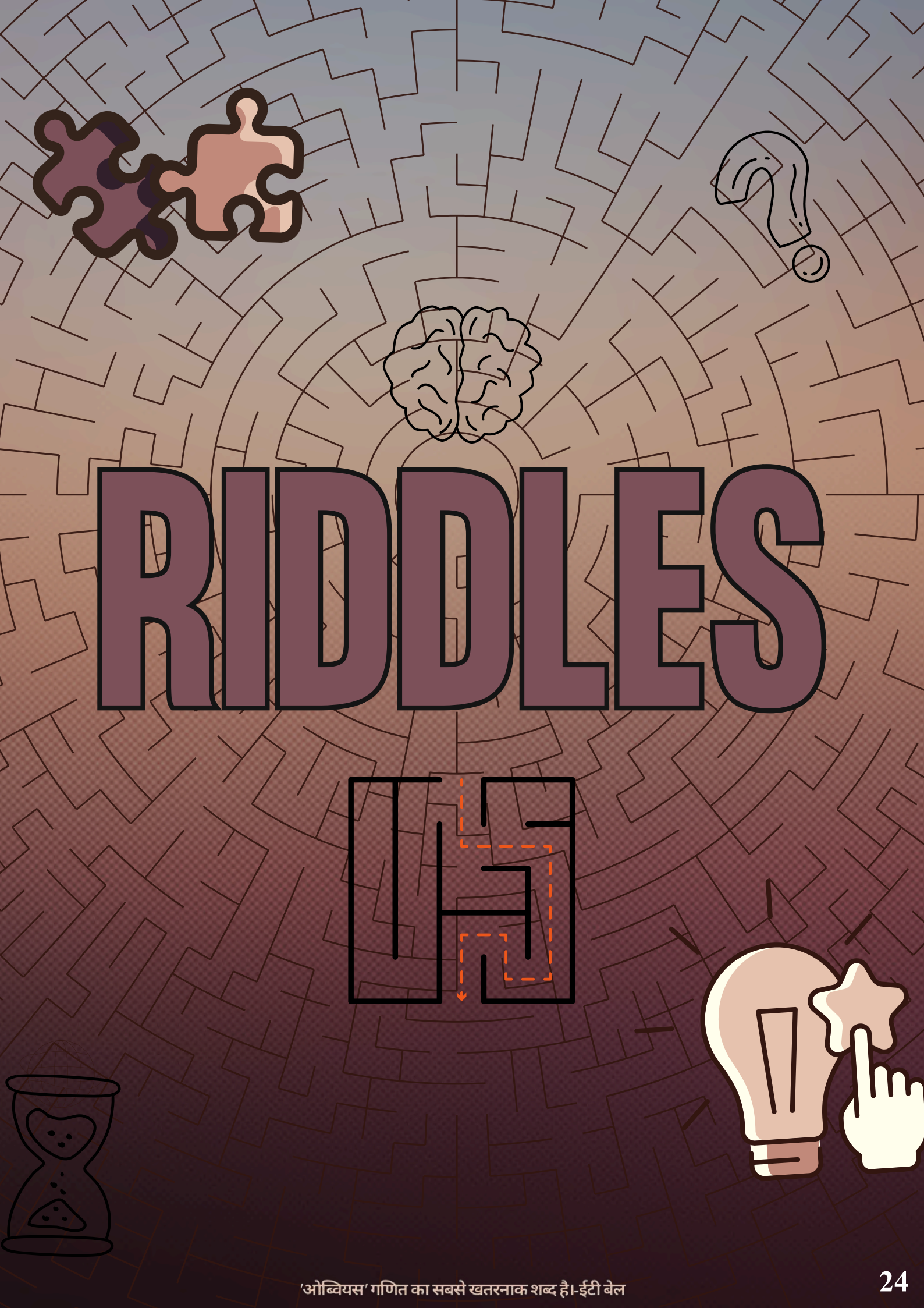
1) Definition: The paradox arises within set theory, specifically in attempts to define sets of all sets that do not contain themselves.

2) Assumption: Suppose there exists a set R that contains all sets that do not contain themselves. Symbolically , R = { x : x∉x}

3) Contradiction: If R contains itself (R ∈R) , then by its definition it shouldn't contain itself.But if R doesn't contain itself , then by its definition ,it should contain itself . This is contradiction.

IN ESSENCE, THE RUSSELL PARADOX DEMONSTRATES THE INHERENT CONTRADICTIONS THAT CAN ARISE WHEN DEALING WITH SELF-REFERENTIAL SETS WITHIN CERTAIN SYSTEMS OF LOGIC AND SET THEORY

4) Implications: The paradox undermines naïve set theory and highlights the need for more rigorous foundations in mathematics, which led to the development of axiomatic set theory.


RIDDLES

1

In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the lake?

2

You have 14 brown socks, 14 blue socks and 14 black socks in your sock drawer. How many socks must you remove (without looking to be sure) to have a matched pair?

3

Mr. Smith has 4 daughters. Each of his daughters has a brother. How many childern does Mr. Smith have?

4

If two hours ago, it was as long after one o'clock in the afternoon as it was before one o'clock in the morning, what time would it be now?

5

There are 25 red balls, 47 green balls and 3 blue balls in a basket. There is a blind man. What is the minimum number of balls that the blind man has to pick to make sure that there are at least 2 balls of different colors?

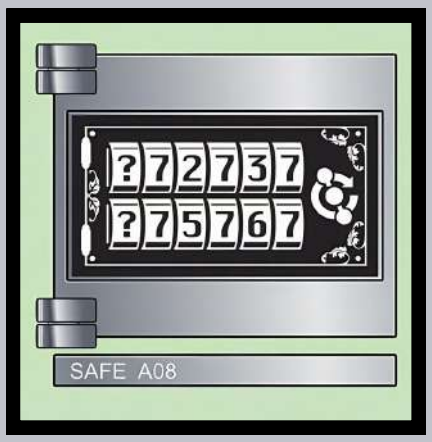
"You don't have to be a mathematician to have a feel for numbers."-John Forbes Nash

6

There are 500 coffins and 500 men who need them. The undertakers asks the first man to go to every coffin and open them. Then he tells the second man to go to every one and close it. The third one goes to every third coffin and so on. How many are open?

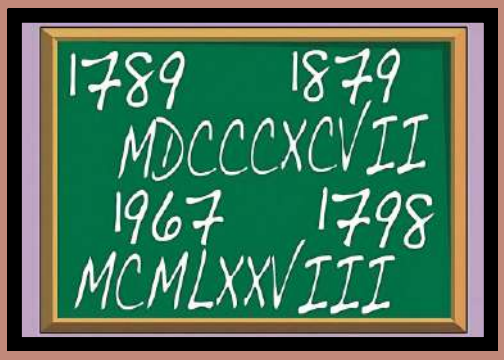
7

To open this safe, you have to replace the question marks with the correct figures. You can find this figure by determining the pattern behind the numbers shown.



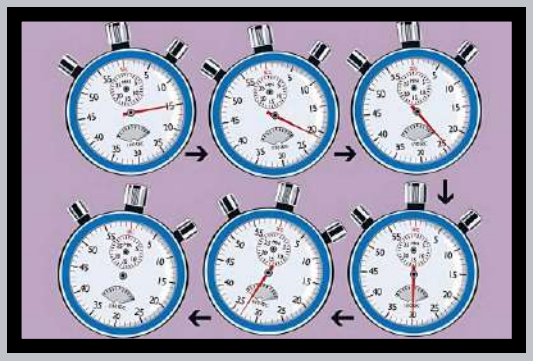
8

Which year does not belong on the chalkboard?



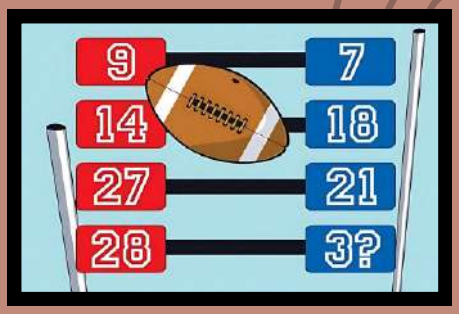
9

The winner has run the distance in 15 seconds, the second in 21 seconds, etc. How many seconds will it take the sixth athlete to cross the line?



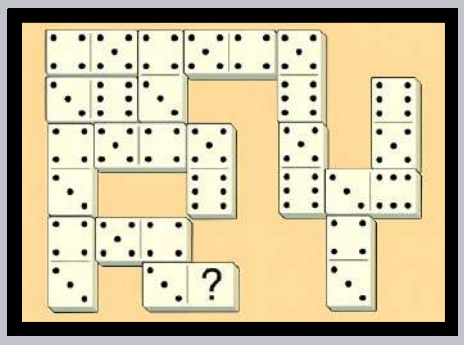
10

Which digit should replace the question mark in the score?



11

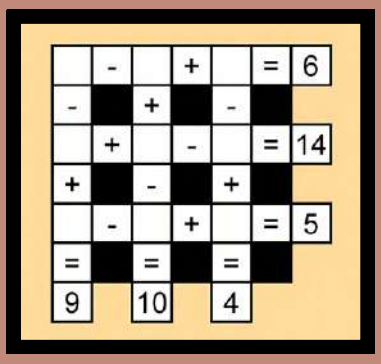
How many spots should replace the question mark on the domino?



12

Enter numbers in each row and column to arrive at the end totals.

Only numbers 1 through 9 are used, and each only once.



NOTE: *Solutions at the end of magazine*

बहुभिर्प्रलापैः किम् त्रयलोके सचरारे। यद् किंचिद् वस्तु तत्सर्वम् गणितेन् बिना न हि ॥ — महावीराचार्य

IMPORTANT MATH'S DAYS

Mathematics Days

14 JANUARY — World Mathematical Logic day

Euler's Day — FEBRUARY 07

11 FEBRUARY — World Mathematical physics Day

World Algebra Day — FEBRUARY 12

28 FEBRUARY — World Mathematical Finance Day

World Mathematics Day — MARCH 01

14 MARCH — International Day of Mathematics

World Calculus Day — MARCH 14

04 APRIL — Square Root Day

World Statistics Day — APRIL 20

22 JULY — World Pi Approximation Day

"The whole of mathematics consists in the organization of a series of aids to the imagination in the process of reasoning."
- Alfred North Whitehead

IMPORTANT MATH'S DAYS

Mathematics Days

20 OCTOBER — World Probability Day

World Number Theory Day — OCTOBER 21

29 OCTOBER — World Fractal Day

Golden Ratio Day — OCTOBER 31

10 NOVEMBER — World Mathematical Biology Day

World Trigonometry Day — NOVEMBER 12

23 NOVEMBER — Fibonacci Day

World Game Theory Day — DECEMBER 05

08 DECEMBER — World Mathematics Education

World Cryptography Day — DECEMBER 09

22 DECEMBER — National Mathematics Day

"Mathematics is the art of giving the same name to different things."-Henri Poincare

2023-24

REPORT

Seminar on Vedic Mathematics

The Vedic Mathematics Seminar,by 'Dr.Gunjan Khurana' held on 25th October 2023, brought together mathematics enthusiasts and educators to explore the ancient Indian system of mathematics, known as Vedic Mathematics.

The objective of the seminar was to introduce students to the principles and techniques of Vedic Mathematics, which is a unique system of mathematical calculations based on ancient Indian scriptures known as the Vedas. The event aimed to enhance understanding, appreciation, and application of Vedic Mathematics in modern education.

Trip To Adventure Island

The main aim of the trip was to offer students and educators from the Mathematics Department a break from academic studies while promoting unity and companionship among them.

The Mathematics Department's trip to Adventure Island was a resounding success, showcasing the department's dedication to holistic education. Such activities, blending recreation with intellectual engagement, play a vital role in enhancing the educational experience and creating lasting memories for students and educators.

2023-24

REPORT

Seminar on Career opportunities after Graduation

The seminar conducted by Mr. Rajendra Dubey, Director of DIPS Academy, aimed to enlighten attendees about the diverse career options available to mathematics graduates. With his extensive teaching experience and entrepreneurial insight, Mr. Dubey sought to provide valuable insights into the realm of post-graduation opportunities in mathematics.

Seminar on Women in Mathematics and Cryptography

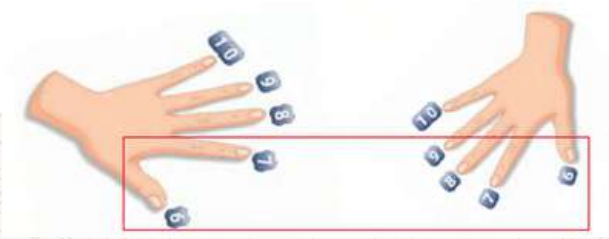
The seminar conducted by Prof. Geetha Venkatraman on the topic Women in Mathematics and Cryptography aimed to inform students about the achievements and milestones women have reached in the field of mathematics, inspiring the women of Bharati College. The second half of the seminar focused on cryptography, introducing students to the topic and providing insights into encrypting and decrypting data.

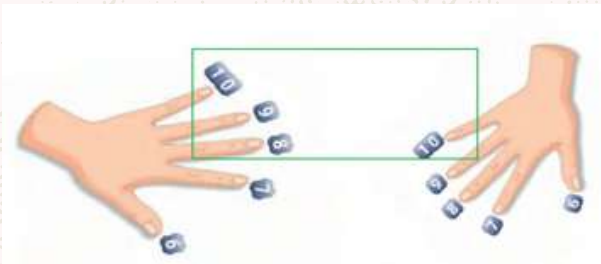
"In mathematics, the art of proposing a question must be held of higher value than solving it." - Georg Cantor

LET'S PLAY A GAME

Trick of Multiplying the Numbers

1. Label your finger from 6 to 10 from thumbs to pinky finger on each hand .
2. To do 7 times 9 , touch the finger of 7 and 9.
3. Then count the touching fingers and ones below.
4. This is 6 fingers, which makes 60 in the answer .
5. Then we have 3 on one hand multiplied by 1 on the other hand ,which makes for 3.
6. So 7 times 9 is equal to 63.





Beauty of Numbers

$1^2 = 1$

$(11)^2 = 121$

$(111)^2 = 12321$

$(1111)^2 = 1234321$

$(11111)^2 = 123454321$

$(111111)^2 = 12345654321$

$(1111111)^2 = 1234567654321$

$(11111111)^2 = 123456787654321$

$(111111111)^2 = 12345678987654321$

Visualization of Pi(π) being irrational

$$Z(\theta) = e^{\theta i} + e^{\pi\theta i}$$

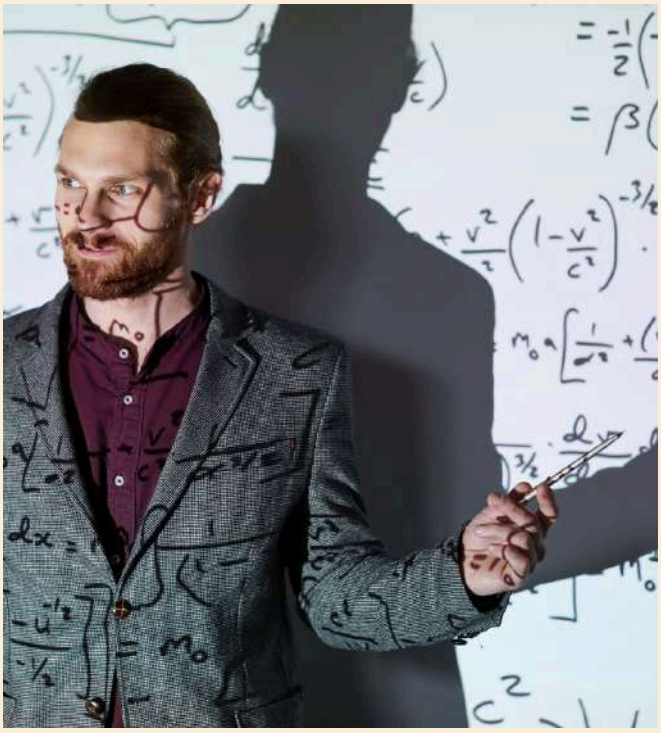
CAREER OPPORTUNITIES

AFTER

B.SC.(H) MATHEMATICS

Retail Banker

Students with deep mathematical and financial knowledge along with customer service skills, multi-tasking ability and computer knowledge can opt for being a retail banker.



Subject Matter Expert

Students with time management, communication and research skills can become expert and help students and organizations understand mathematical concepts.

Acturial Scientists

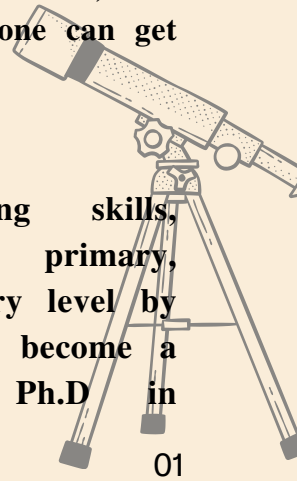
A Student good at statistics and economics along with analytical skills , problem solving and research skills can give actuarial science exams (CTs,STs,SAs) .

Competitive exams

By giving exams like UPSC, State PSC, SSC CGL, banking, railway exams one can get good and secured job.

Teaching

One with good teaching skills, communication skills teach primary, secondary or senior secondary level by clearing B.Ed and can also become a lecturer by completing Ph.D in Mathematics.



01

Actuarial Analyst

It works in various fields they also predict uncertain future events impacting position of business.It requires critical thinking skills, problem solving skills.

Operational Research

Deals with various methods in order to make better decisions. Main motive is to achieve best performance and protect firms from uncertain futures .

Accounting and Professional Services

Job is to work in areas such as audit, consulting and advising etc. Accounting skills, adaptive skills and organisational skills are required.

Financial Analyst*

It is the job to provide information to help traders which involves rigorous analysis to make important decisions. An analyst provides information to various fund managers, investment banks.

Courses after BSc Maths

One with good teaching skills, communication skills teach primary, secondary or senior secondary level by clearing B.Ed and can also become a lecturer by completing Ph.D in Mathematics.

"Go down deep enough into anything and you will find mathematics."-Dean Schlicter

ALUMNI

GURLEEN KAUR

Senior Data Analyst at Blooming Bay-Flowers & Plants Trading L.L.C-Dubai.

"For anyone reading this who has yet to decide what their life should look like in the coming years; I suggest you start listing down what it "should not" look like. Be opportunistic and get into the habit of accepting internships, job prospects, projects, or start-up ideas, being presented to you. Work with utmost respect and diligence on all the opportunities you accept or create to build a high-profile skill set. Time is your most valuable asset; invest it wisely, for your present actions sculpt your future reality. Learn self-acceptance, and only then will you be able to evolve into a better version of yourself.

PS: Learn to love your own company and focus on cultivating a growth mindset if you are eager to succeed".

GOOD LUCK!

ANSHU SINDHU

Postal Assistant, Department of Post

"My experience with Bharati College, University of Delhi has proved to be very enlightening in terms of both my academics as well as personal development. I pursued B.Sc.(H) Mathematics from the college. It was very delightful to have so insightful and sagacious professors who guide us like a watchful guardian. Here, from dynamic syllabus to thoughtful presentations, one finds a different perception to look at things. My experience with college and faculty was very mesmerizing and those 3 years will be my treasure for the rest of my life.."

BEST WISHES!

SANJANA SENGAR

Currently doing an internship in National Remote Sensing Center RRSC-W ISRO Jodhpur as a project trainee.

"Congrats on the first magazine release from Bharati College, University of Delhi! It's all about math and it's gonna be awesome. With cool stories and fun articles, you'll keep everyone interested.

And guess what? In the future, math will solve big problems and make amazing things happen. Let's dive in together!"

BEST WISHES!

HIMANSHI BHATIA

Working as a teacher in UK based company, where she is teaching Switzerland and Dubai students

"As an alumni, I wanted to take a moment to share my heartfelt thoughts about our college. It was a commerce college and we are the first batch of science students in 2017 we don't have seniors so we seeked help from commerce students and organised our event include sudoku- quiz competition makes union team. I(himanshi) became the president. In February, we organised our fest for which collecting funds is a challenging task but we got alpha plus which gave us funds and organised 2 day fest which turnout to be amazing everybody participated in that.

As a first batch, we faced many ups and downs but thanks to our esteemed teachers Mrs Anubha ma'am and Ankit sir who was always there to help us."

BEST WISHES!

ALUMNI

Achievements

NAME	POSITION	EVENT	SOCIETY	COLLEGE/COMPANY
Sanjana Nayak	2nd	Presentation of Handcraft item	Azadi ka Amrit Mahotsav	Guru Nanak Dev Khalsa College
Sanjana Nayak	Awarded	Recruiting their students for internship/placement	Placement cell	Ramanujan College
Anoushka Chowdhury	2nd	Script Writing	Tarang, Annual Fest	Lady Shri Ram College
Anoushka Chowdhury	2nd	Horror Story Writing Competition	_	Forever Living Products
Anshika Jha	2nd	Poetry Competition	YUVA	Bharati College
Anshika Jha	3rd	Speech Competition	YUVA	Bharati College
Anshika Jha	1st	Speech Competition	Sanskrit Department	Bharati College
Anshika Jha	1st	Debate	NSS	Bharati College
Anshika Jha	1st Runner up	Debate	NCC	Indira Gandhi Institute of Physical Sciences
Anshika Jha	1st	Best Delegate at Maths Debatrix	Maths Department	Miranda House
Prachi Maurya	1st at district level	Declamation competition	NYKS, South West Delhi	Viksit Bharat 47
Prachi Maurya	1st	Speech Competition	YUVA	Bharati College
Prachi Maurya	1st	Speech Competition	YUVA	Bharati College
Prachi Maurya	3rd	Tark-Vitarak Debate Competition	Journalism Department	Bharati College
Pragya Singh	2nd	Inter -college Mathematical Quiz & Presentation	Math Venture	Shaheed Bhagat Singh College.
Tannu Priya	2nd	Inter -college Mathematical Quiz & Presentation	Math Venture	Shaheed Bhagat Singh College.
Prachi Maurya	2nd	Inter -college Mathematical Quiz & Presentation	Math Venture	Shaheed Bhagat Singh College.
Riya Vishwakarma	2nd	Inter -college Mathematical Quiz & Presentation	Math Venture	Shaheed Bhagat Singh College.
Prachi Maurya	1st	Group folk dance	Vimarsh - Annual YUVA	Satyawati College
Namita Gurung	1st	Group folk dance	Vimarsh - Annual YUVA	Satyawati College
Nikita	1st	Group folk dance	Vimarsh - Annual YUVA	Satyawati College
Prachi Maurya	Awarded	For being the host		Blue Star Publications Event
Anshika Jha	1st	Solo Dance	Vimarsh - Annual YUVA	Satyawati College

Proof by Memes:

Demonstrating Mathematical Principles with Humor

IN EXAM HALL

Me: Can't remember the proof of the theorem I studied the night before...

Nobody:

Me to the proof hidden in my brain:

When someone asks you: Maths Honors leke kya soch rhe ho

Me:

Me the night before exam:

(In exam) Q: What is Weistrass M-test used for?

My brain to me:

Me after studying the entire night thinking I have covered the syllabus...

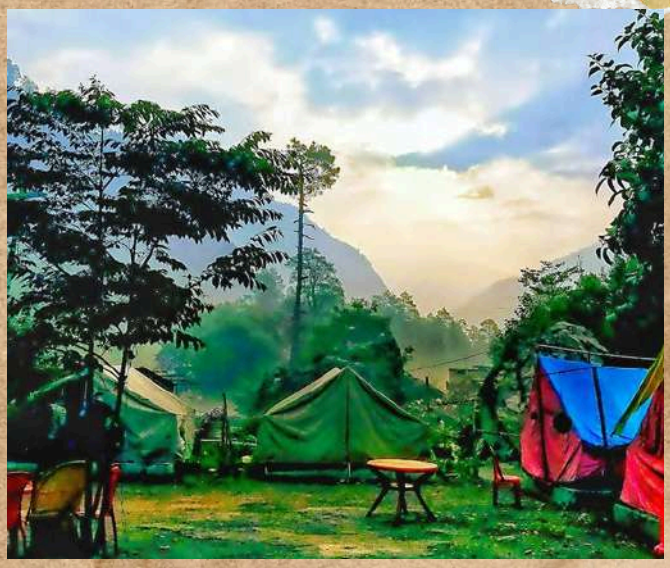
Me after seeing the question paper:

– Anoushka Chowdhury
B.Sc.(H)Mathematics

शुद्ध गणित, अपने तरीके से, तार्किक विचारों का काव्य है।

THE ART OF NOTICING

DR.ANKIT GUPTA



PRAGYA SINGH 2ND YEAR

MANSI NEEL 3RD YEAR

TANNU PRIYA 2ND YEAR

THE ART OF NOTICING

NIKITA VARSHNEY 2ND YEAR

SANJANA NAYAK 2ND YEAR

DEEPA ADHIKARI 1ST YEAR

PRACHI MAURYA 2ND YEAR

"If people do not believe that mathematics is simple, it is only because they do not realize how complicated life is."

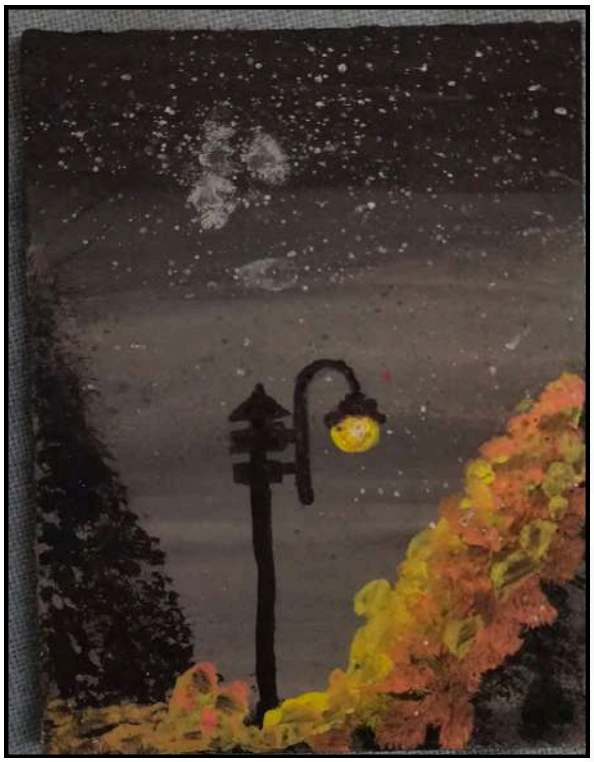
- John von Neumann

ARTISTIC CANVAS

SWATI SHARMA 2ND YEAR

HARSHITA 3RD YEAR

GHANIYA 1ST YEAR

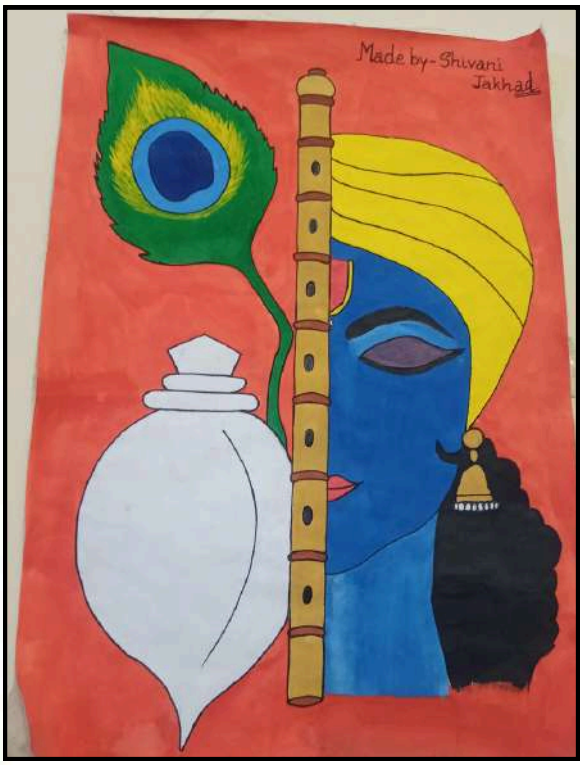


PRAGYA SINGH 2ND YEAR

ARTISTIC CANVAS

ANU 3RD YEAR

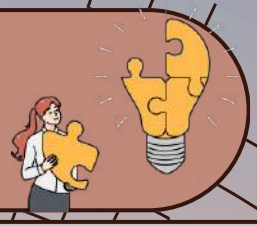
KHUSHBU 2ND YEAR



SHIVANI 2ND YEAR

TANNU PRIYA 2ND YEAR

SOLUTIONS



1. The patch doubles in size every day and so on the 47th day the patch will be half the size it is on the 48th day .

2. four | **3.**five

4. 48 balls.(There is a small chance he may pick up 47 green balls in a row).

5. Nine | **6.** 22

7. 1 and 4. (They're arranged in groups of two-digit numbers, all ending in 7 and ascending in both rows).

8. 1967. (All the other years are formed with the same figures).

9. 39 seconds. This is the formula:
15 + (1 + 5) = 21; 21 + (2 + 1) = 24; 24 + (2 + 4) = 30; 30 + (3 + 0) = 33; 33+ (3+3) = 39

10. 6, (The difference in the scores forms the following series: -2, +4, -6, +8. Alternating per column you also see the following two series: 7, 14, 21, 28; 9, 18, 27, 36).

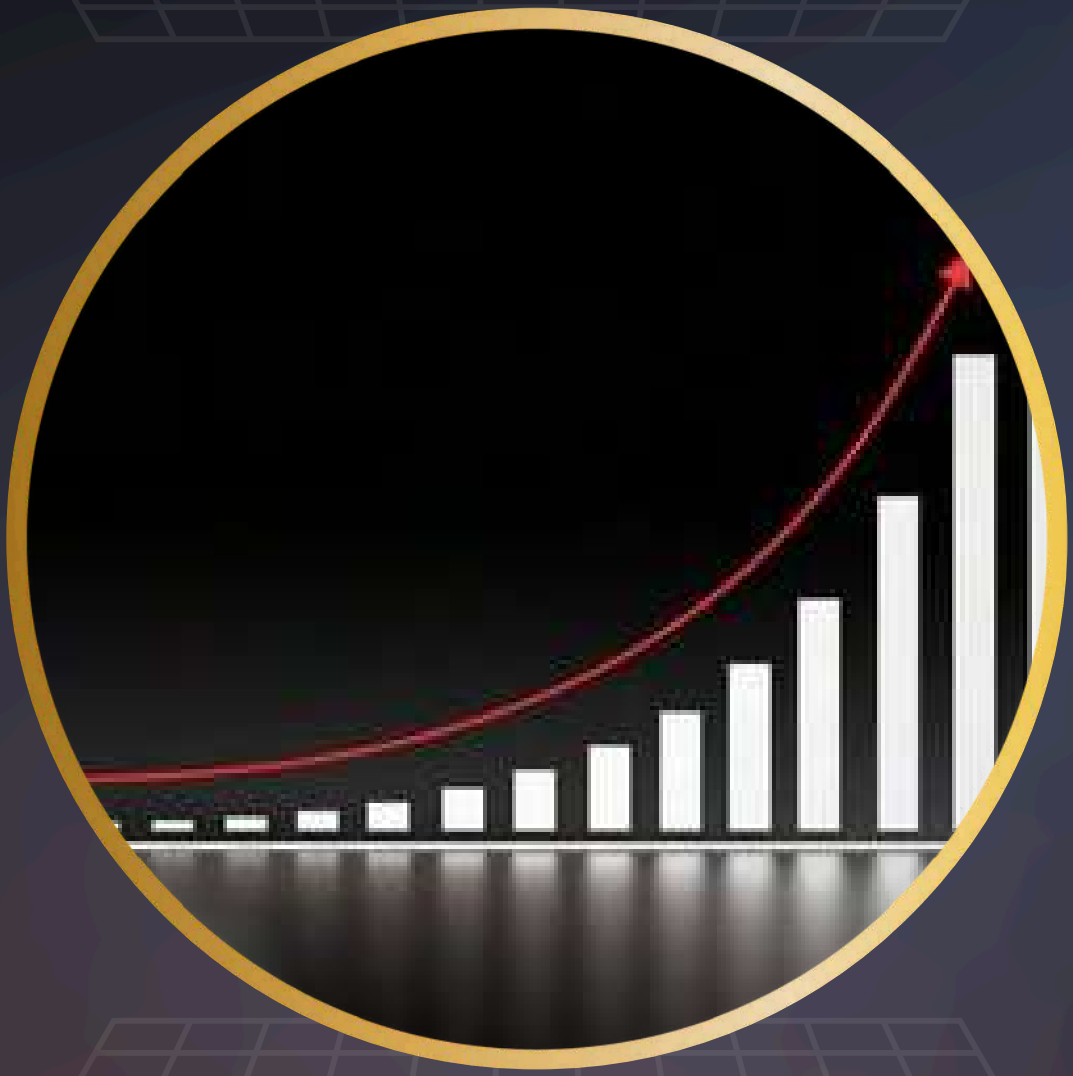
11. 6 spots. (The dominoes are on an imaginary grid and the number of spots corresponds to the domino's spot on the grid. The grid contains alternating rows with numbers 4, 5, 4, 5, 4, 5, 4, 5 and the numbers 3, 6, 3, 6, 3, 6, 3, 6).

12.

8	-	5	+	3	=	6
-		+		-		
6	+	9	-	1	=	14
+		-		+		
7	-	4	+	2	=	5
=		=		=		
9		10		4		

"The only way to learn mathematics is to do mathematics." - Paul Halmos

To a New Beginning..



Department of Mathematics
Bharati College
University of Delhi

"For example is not a proof"
-Carl Gustav Hempel