

Ajit Iqbal Singh—A Pioneer in Indian Mathematics



Professor Ajit Iqbal Singh is a distinguished Indian mathematician known for her important contributions to functional analysis, harmonic analysis, and, more recently, quantum information theory. Born in 1943 in Okara, Pakistan, she developed a deep interest in mathematics and went on to become one of India's respected women mathematicians. Her career has combined research,

teaching, academic leadership, and the encouragement of younger generations of mathematicians.

Singh began her higher education at the University of Delhi. She completed her B.A. (Honours) in Mathematics in 1963 and her M.A. in Mathematics in 1965. Her academic ability was recognized through awards including the Rai Bahadur Brij Mohan Lal Saheb Memorial Gold Medal and the Ravi Kanta Devi Prize of the University of Delhi. After completing her master's degree, she briefly taught at Indraprastha College in Delhi.

In 1966, Singh travelled to the University of Cambridge as a Commonwealth Scholar and studied at Newnham College. She pursued doctoral research under the supervision of the distinguished mathematician F. Smithies and received her Ph.D. in Mathematics in 1969. Her doctoral dissertation, Contributions to the Theory of Linear Operators in Locally Convex Spaces, reflected her early specialization in functional analysis, an area concerned with vector spaces, operators, and the mathematical structures underlying them.

After returning to India, Singh joined Hindu College, University of Delhi, where she taught while continuing her research. In 1974, she became a Reader in Mathematics at the University of Delhi South Campus. She was promoted to Professor in 1984 and remained in that position until her retirement in 2008. She also served as Head of the Department of Mathematics from 1993 to 1996. During her academic career, she held visiting positions at institutions including the University of Oregon, Panjab University, a research centre in Munich, and Ohio University.

Singh's research has covered several sophisticated areas of mathematics. Her work includes linear operators in locally convex spaces, topological algebra, spectral synthesis in hypergroups, semi-group algebras, multipliers and module homomorphisms, and the geometry of vector measures. She has also explored applications

of harmonic analysis to differential equations and orthogonal polynomials. Her later research interests have expanded toward quantum information theory, demonstrating her ability to connect classical mathematical analysis with emerging areas of science.

Beyond research, Singh has made a lasting contribution through teaching and mentorship. She has supervised M.Phil. and Ph.D. students and helped develop younger mathematicians through her academic guidance. Her influence can be seen in the careers of researchers who studied under her, including mathematicians who have gone on to hold prominent academic positions.

Her achievements have been recognized by India's scientific community. Singh was elected a Fellow of the Indian National Science Academy in 1999 and a Fellow of the National Academy of Sciences, India, in 1996. After retiring from the University of Delhi, she continued her research at the Indian Statistical Institute, Delhi Centre, as an INSA Senior Scientist and later as an Honorary Scientist. She is now associated with the Indian National Science Academy as an Emeritus Scientist.

Ajit Iqbal Singh's life represents the value of perseverance, scholarship, and intellectual curiosity. From her early education in Delhi and doctoral studies at Cambridge to decades of research and teaching in India, she has played an important role in advancing mathematical scholarship. Her work and mentorship have helped strengthen the presence of women in higher mathematics and continue to inspire students and researchers.

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EDITORIAL

The Mathematics

Mathematics: Foundation of the Different Startup Business

In today’s rapidly changing world, mathematics is no longer confined to classrooms, textbooks and examinations. It has become a powerful tool for creating innovative businesses and solving everyday problems. A startup based on mathematics can be different because it can combine logical thinking, technology and practical solutions to serve society.

One promising idea is a Mathematics-Based Financial Planning Startup. Many young people, small businesses and families struggle to manage their money. Such a startup could use mathematical models and artificial intelligence to analyse income, expenses, savings and investments. It could then provide personalised financial plans, predict future expenses and suggest suitable saving strategies. Unlike traditional financial services, this business could make mathematical decision-making simple and accessible to ordinary people.

Another interesting possibility is a Mathematics Learning Startup that makes education more practical and enjoyable. Instead of memorising formulas, students could learn mathematics through games, puzzles, real-life situations and interactive challenges. Data analysis could identify each student's strengths and weaknesses and create personalised learning programmes. Such a venture could help transform mathematics from a difficult subject into an exciting experience.

Mathematics can also support startups in agriculture, transportation, healthcare and climate management. Mathematical models can predict crop production, optimise delivery routes, analyse market demand and identify patterns in large amounts of data. Therefore, entrepreneurs who understand mathematics can discover opportunities that others may overlook.

The success of a mathematics-based startup, however, depends not only on calculations. It requires creativity, communication, technology and an understanding of people's needs. Mathematics provides the foundation, while innovation turns that foundation into a useful product or service.

In conclusion, mathematics is much more than numbers and equations. It is a language of logic, prediction and problem-solving. A startup built around mathematical thinking can create employment, improve decision-making and address real social challenges. The entrepreneurs of tomorrow should therefore see mathematics not merely as a school subject, but as a powerful engine for building different, intelligent and successful businesses.

RECENT NEWS

MAJOR (Graduation)



Mathematician Terence Tao's lecture on AI vs. MATHS

Terence Tao’s “Mathematics in the age of AI” lecture at the 2026 International Congress of Mathematicians, it is a particularly interesting take because Tao largely sidesteps the question “How powerful will AI become?” and asks a deeper question: What is mathematics for, and what should mathematicians value if AI can increasingly do the problem-solving?

The central idea

Tao proposes essentially a thought experiment:

Suppose AI eventually becomes capable of doing substantial research-level mathematics.

Rather than arguing about whether that will happen, condition on it happening and ask what follows. His concern is that mathematics may face a crisis of values, rather than merely a technological disruption.

The key distinction is between solving problems and doing mathematics.

A mathematical research paper isn't valuable merely because it contains

a correct answer. Mathematics also involves:

- understanding why something is true;
- finding explanations and conceptual frameworks;
- communicating results to other humans;
- verifying and integrating results into existing knowledge;
- deciding which questions are interesting;
- developing mathematical taste and intuition;
- training the next generation of mathematicians.

AI could make the first of these dramatically cheaper without automatically making the others cheaper.

“Proof abundance” could actually be a problem

Historically, producing a proof has been expensive. If AI can generate thousands or millions of plausible proofs, the bottleneck changes.

The problem becomes something like:

How do we know which results matter, which proofs we should understand, and how do we organize all this new mathematics?

Tao worries about a kind of “proof indigestion”: an enormous quantity of technically correct material that humans don't have the cognitive capacity to absorb.

That leads to an important inversion:

When answers become abundant, judgment becomes scarce.

His concern about “over-smooth” mathematics

One of the most subtle points is about difficulty itself.

When humans struggle through a difficult proof, the struggle can teach them something about the underlying mathematical ideas. Tao gives the example of working through a difficult Jean Bourgain paper as a graduate student. The difficulty forced him to reconstruct how Bourgain was thinking, and that process became part of his mathematical education.

An AI-generated proof might be much cleaner and easier to verify—but that doesn't necessarily mean it is better for human understanding.

So there is a potential paradox:

AI could make mathematical exposition more polished while making mathematics less understandable to humans.

AI doesn't eliminate the mathematician

Tao therefore doesn't frame the future as:

AI solves mathematics → mathematicians become obsolete.

Instead, he sees a possible shift in the division of labor.

AI might increasingly handle:

- searching enormous mathematical spaces;
 - generating candidate arguments;
 - checking computations;
 - formalizing proofs;
 - suggesting conjectures;
 - exploring variations of an argument.
- Humans may increasingly have to handle:
- choosing worthwhile problems;
 - recognizing important patterns;
 - deciding what deserves to be believed or investigated;
 - extracting concepts from machine-generated results;
 - explaining why a result matters;
 - building coherent theories out of disconnected discoveries.

This connects with Tao's broader writing on AI and mathematics, where he argues that AI should be evaluated not only by the microscopic problems it can solve, but by its effect on mathematical knowledge and human flourishing more broadly.

One especially important consequence

Tao argues that the mathematical community may need to change its incentives.

If the prestige system heavily rewards “being the first to solve X”, then AI could create perverse incentives: researchers may race to generate machine-assisted results without investing enough effort in understanding or consolidating them.

Instead, mathematics might need to place greater value on things like:

explanation + verification + synthesis + understanding.

He also advocates transparency about AI use, continued human responsibility for published work, and strengthening mechanisms for review and verification.

The historical analogy

Tao's broader argument is surprisingly optimistic.

He compares the AI moment to earlier foundational crises in mathematics. Around 1900, paradoxes and discoveries in logic forced mathematicians to become much more explicit about the foundations of mathematical reasoning. The result was not the death of mathematics, but a more rigorous and resilient discipline.

He suggests AI may produce a comparable “crisis in the foundations of mathematical values and practices.

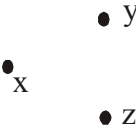
In other words:

The challenge isn't merely to make AI good at mathematics. It's to make mathematics good at living with AI.



Catch me if you can

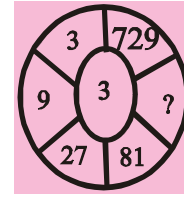
Classes (I - II)

- $85 + * = 91$ what will replace the *.
(a) 4 (b) 5 (c) 6 (d) 7
- Write the number in between 4039 and 4041.
(a) 4040 (b) 4038 (c) 4042 (d) 4037
- See the pattern and fill in the 5400, 5500, 5600,
(a) 5800 (b) 5300 (c) 5900 (d) 5700
- Find out the correct Statement :
(a) An odd number has an odd digit in the ones place
(b) Some even number have odd digit in the ones place.
(c) Every number is either even or odd.
(d) A number cannot be even and odd at the same time.
- The sum of present age of a father and his son is 50 years.
What will be the sum of their ages after 5 years.
(a) 55 years (b) 60 years (c) 40 years (d) 45 years.
- Write the greatest and smallest numbers of four digit can be formed with the digit 6, 0, 8, 2.
(a) 8026, 0268 (b) 8620, 2086
(c) 8620, 2068 (d) 8260, 2068
- In which of the following figure, the given shape (×) as embedded as its part.
P
(×)
(a)  (b)  (c)  (d) 
- If Arun connects the points shown here with line segments.
What shape will he make.

(a) Triangle (b) Square (c) Rectangle (d) Hexagon
- Micky collects sticks from the Jungle. He sells them in the market, He uses 14 sticks to make 1 bundle. How many sticks will 6 bundles have ?
(a) 20 sticks (b) 60 sticks (c) 42 sticks (d) 84 sticks
- If '536' is called '315'; '782' is called '864' then '572' is called _____
(a) 384 (b) 484 (c) 483 (d) 285

10. 1234561234561 What is the 18th number in the series ?

(a) 2 (b) 6 (c) 5 (d) 4

11. Find the missing number.

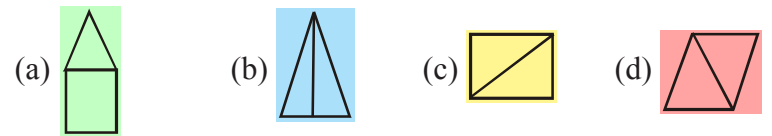


(a) 162 (b) 351
(c) 243 (d) None of these

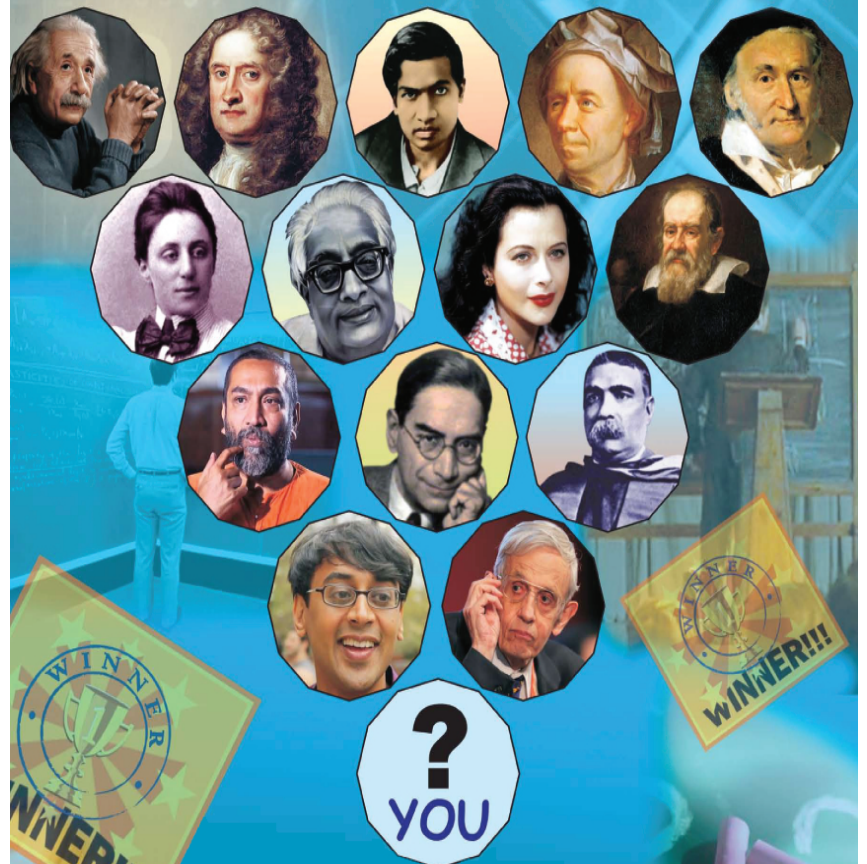
12. 3, 5, 6, 10, 9, _____, 12, 20.

(a) 15 (b) 10 (c) 20 (d) 25

13. Find the odd one out.



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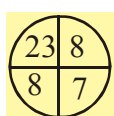
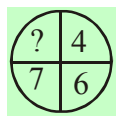
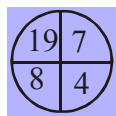
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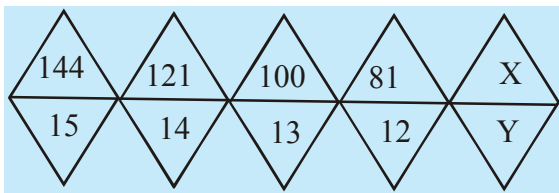
Classes (III-IV)

1. By which number can you replace the question mark in the pattern ?



- (a) 17 (b) 18 (c) 21 (d) 19

2. Find the missing numbers X and Y respectively.



- (a) 60, 10 (b) 64, 11 (c) 49, 11 (d) 55, 10

3. Complete the number pattern below



- (a) 63 (b) 59 (c) 57 (d) 61

4. Identify the relation between the given pair on either side of :: and find the missing figure.

J : P :: ? : R

- (a) L (b) O (c) B (d) A

5. Find the meaningful combination of numbers so that letters are arranged accordingly to form a meaningful word.

L C I E R C

1 2 3 4 5 6

- (a) 6, 5, 1, 3, 2, 4 (b) 6, 3, 2, 5, 1, 4
(c) 6, 3, 5, 2, 1, 4 (d) 6, 2, 5, 3, 1, 4

6. In which of the following series the number of the letters skipped between adjacent letters is same ?

- (a) RSTU (b) NPQS (c) UWXYZ (d) WXYA

7.

3	6	9
21	33	48
51	60	?

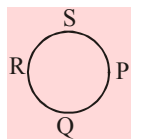
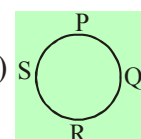
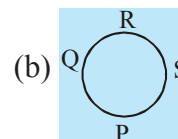
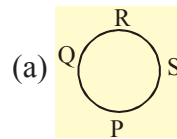
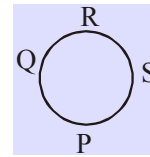
- (a) 62 (b) 18 (c) 20 (d) 19

8. Find the mirror image of each figure given below when mirror is palced vertically to the left.



- (a) 52:8 (b) 25:8 (c) 22:8 (d) 8:55

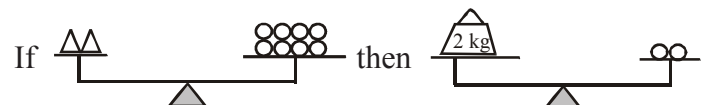
9. The given diagram shows the original position of a steering wheel. Which of the following diagrams show the correct position of the wheel after it has been turned turns to the right.



10. Which of the following is equivalent to $\frac{2}{5}$?

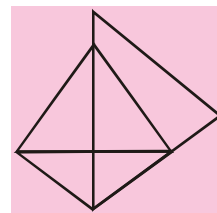
- (a) 0.25 (b) 0.4 (c) 2.5 (d) 4%

11. How many  do you need to balance the last set up ?



- (a) 14 (b) 8 (c) 10 (d) 12

12. Count the number of triangles in the given figure.

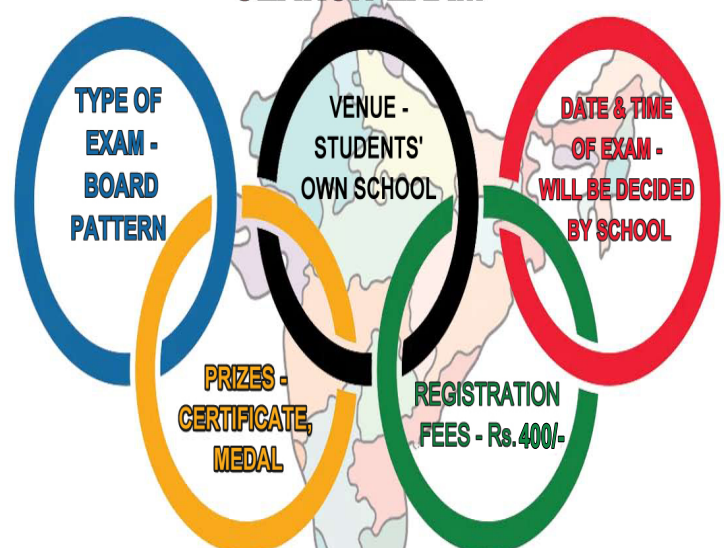


- (a) 5 (b) 6 (c) 9 (d) 4

13. Complete the number pattern using suitable numbers 1, 121, 12321, 1234321, _____.

- (a) 123454321 (b) 12354321
(c) 12345321 (d) 1234554321

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Classes (V-VI)

1. Tank A contain 5 times of much water as Tank B. How much water must Harsh transfer from Tank A to Tank B so that each tank contains 45 liters of water.

(a) 60 liters (b) 30 liters (c) 75 liters (d) 90 liters

Answer the question (2 and 6) based on the given stars.



2. How many stars are to the right of second star from left end ?

(a) 9 (b) 10 (c) 7 (d) 8

3. If U interchanges the position with V, then the number of stars in the row is _____

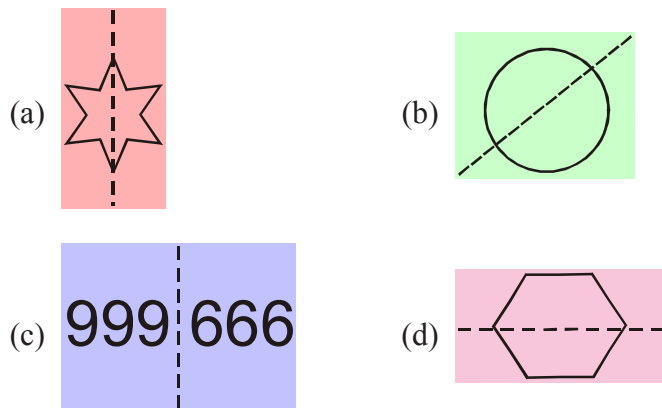
(a) 10 (b) 11 (c) 9 (d) 12

4. Find out the word which cannot be made from the letters of the given words.

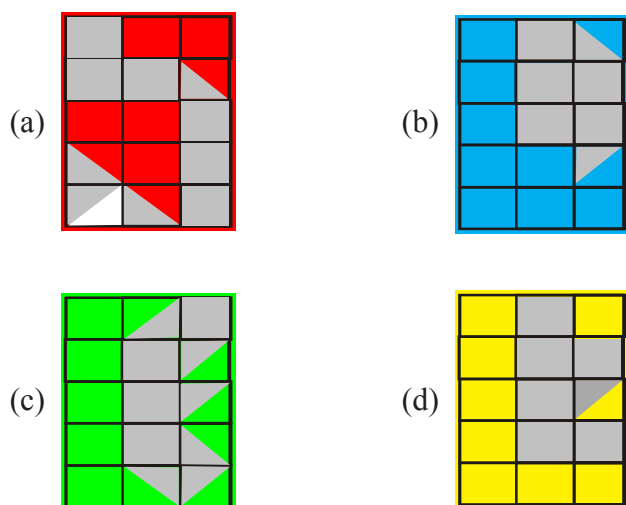
UNCONSCIOUS

(a) SON (b) COIN (c) SUN (d) NOSE

5. Which figure does not represent a line of symmetry ?



6. Which one of the shapes given below has the largest portion shaded ?



7. The H.C.F of 624,936 and 264 is –

(a) 0 (b) 24 (c) 32 (d) 91

8. The population of a certain city is x now. It becomes y times of itself after one year. What will be its population after 2 years ?

(a) x^2y (b) y^2x (c) xy (d) x^2y^2

9. One side of a square plot is 250m. What will be the cost of leveling it at the rate of Rs. 2 per square metre.

(a) 125000 (b) 125569
(c) 134000 (d) None of these

10. Find the breadth of the rectangle whose perimeter is 360 cm and whose length is 100 cm.

(a) 81 cm (b) 80 cm (c) 59 cm (d) 69 cm

11. Arranging the following fractions in decreasing order we get the fractions :

$$\frac{3}{8}, \frac{5}{6}, \frac{2}{4}, \frac{1}{3}, \frac{6}{8}$$

(a) $\frac{6}{8}, \frac{2}{4}, \frac{5}{6}, \frac{1}{3}, \frac{3}{8}$ (b) $\frac{5}{6}, \frac{6}{8}, \frac{2}{4}, \frac{3}{8}, \frac{1}{3}$
(c) $\frac{1}{3}, \frac{3}{8}, \frac{2}{4}, \frac{6}{8}, \frac{5}{6}$ (d) None of these

12. The ratio of the length of a school ground to its width is 5 : 2. Find the length if the width of the ground is 50m.

(a) 125 m (b) 122 m (c) 96 m (d) 50 m

The Mathematics

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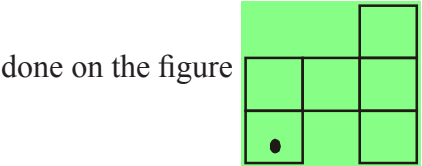
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Classes (VII-VIII)

1. Match List I with List II, with respect to different actions



- | | |
|-------------------|-------------------|
| List I | List II |
| A. | P. Translation |
| B. | Q. Rotation |
| C. | R. Deviation |
| | S. Reflection |
| (a) A-P, B-Q, C-R | (b) A-S, B-R, C-Q |
| (c) A-S, B-P, C-Q | (d) none of these |

2. Given that $\sqrt{10} = 3.16$, what is the value of $\sqrt{\frac{4}{12.1}}$ to one place of decimal ?

- (a) 0.16 (b) 0.06 (c) 0.6 (d) 0.016

3. Which of the following numbers has maximum factors ?

- (a) 36 (b) 76 (c) 82 (d) 19

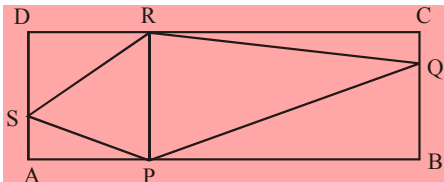
4. $(2.\overline{47} + 3.\overline{53} + 0.\overline{05}) = ?$

- (a) 6 (b) $0.\overline{06}$ (c) $0.\overline{66}$ (d) $6.\overline{01}$

5. A tin of oil was $\frac{4}{5}$ th full, when six bottles of oil were taken out and four bottles of oil were poured into it, it was $\frac{3}{4}$ th full. How many bottles of oil can it contain ?

- (a) 10 (b) 20 (c) 30 (d) 40

6. ABCD is a parallelogram P, Q, R and S are points on sides AB, BC, CD and DA respectively such that AP = DR. If the area of the parallelogram ABCD is 16cm^2 , then the area of the quadrilateral PQRS is



- (a) 6 cm^2 (b) 6.4 cm^2 (c) 4 cm^2 (d) 8 cm^2

7. The value of ‘x’ satisfying the equation $3^{2x} - (2 \times 3^x) + 1 = 0$ is

- (a) 3 (b) 2 (c) 1 (d) 0

8. Five years ago, the age of a man was seven times the age of his son. The age of the man will be three times the age of his son in five years from now. The present age of the man and his son, respectively are

- (a) 68 years and 14 years
(b) 55 years and 15 years
(c) 54 years and 12 years
(d) 40 years and 10 years

9. The expression $a^{\frac{2}{3}} \left\{ a^{\frac{1}{3}} \left(a^{\frac{1}{4}} \right)^4 \right\}^{\frac{1}{4}}$ is equal to

- (a) $a^{\frac{1}{2}}$ (b) $a^{\frac{1}{6}}$ (c) a (d) 1

10. If $a : b = c : d$, then $\frac{ma + nc}{mb + nd}$ is not equal to

- (a) $\frac{a}{b}$ (b) $\frac{c}{d}$ (c) $\frac{a+c}{b+d}$ (d) $\frac{c-a}{b-d}$

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Classes (IX-X)

1. The hypotenuse of an isosceles right-angled triangle is 'q'. If we describe equilateral triangle (outwards) on all its 3 sides, then the total area of the re-entrant hexagon thus obtained is

(a) $q^2(\sqrt{3}+2)$ (b) $\frac{q^2(2\sqrt{3}+1)}{4}$
 (c) $\frac{q^2(4\sqrt{3}-1)}{4}$ (d) $\frac{q^2(5\sqrt{3}-2)}{4}$

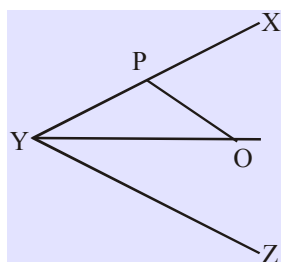
2. The H.C.F. and L.C.M. of two polynomials is $(x-2)$ and respectively. If one of the polynomials is , then the other polynomial is

(a) $x^2-7x+10$ (b) $x^2-5x+10$
 (c) $x^2-4x+10$ (d) $x^2+3x-10$

3. If $\frac{2}{x} + \frac{3}{y} = 2$ and $\frac{6}{x} + \frac{18}{y} = 9$ then the value of 'x' and 'y' respectively, are

(a) 3 and 2 (b) 2 and 3 (c) 4 and 3 (d) 3 and 4

4. O is any point on the bisector of the acute angle XYZ. If the line OP is drawn parallel to ZY, then YPO is



- (a) an equilateral triangle
 (b) a right angled isosceles triangle
 (c) an isosceles triangle but not necessarily a right-angled triangle
 (d) a triangle with two obtuse angles.

5. A student cuts off two circles of radii r_1 and r_2 from a sheet of thick paper. He keeps these two in a vertical position in contact with each other at a point P. Now, he keeps a rod of moderate thickness on the top points A, B of the two circles. If , then for any values of r_1 and r_2 the angle APB is equal to –

(a) 300 (b) 600 (c) 900 (d) 1200

6. AB is a fixed diameter of a circle whose centre is O. From c, any point on the circle, a chord CD is drawn perpendicular to AB then, as C moves over a semicircle, the bisector of angle OCD cuts the circle in a point that always :

- (a) bisects the arc AB
 (b) trisects the arc AB
 (c) is as far from AB as from D
 (d) is equidistant from B and C

7. Manish and Satish were in partnership business for several years. At the end of 2013, a profit of Rs. 35,000 was made by the two. To find out the share of Manish which of the following statements is/are sufficient ?

- I. Manish invested Rs. 35,000 at the beginning of years.
 II. Satish withdrew his capital at the end of the month of July.

III. Satish gets $\frac{1}{5}$ of his investment as share in profits.

- (a) A and B together are sufficient
 (b) B and C together are sufficient
 (c) A and C together are sufficient
 (d) All the three even together are not sufficient.

8. At the start of Seminar, the ratio of the number of male participants to the number of female participants was 3 : 1. During the tea break 16 participants left and six more female participants registered. The ratio of the male to the female participants became 2 : 1. What was the total number of participants at the start of the Seminar ?

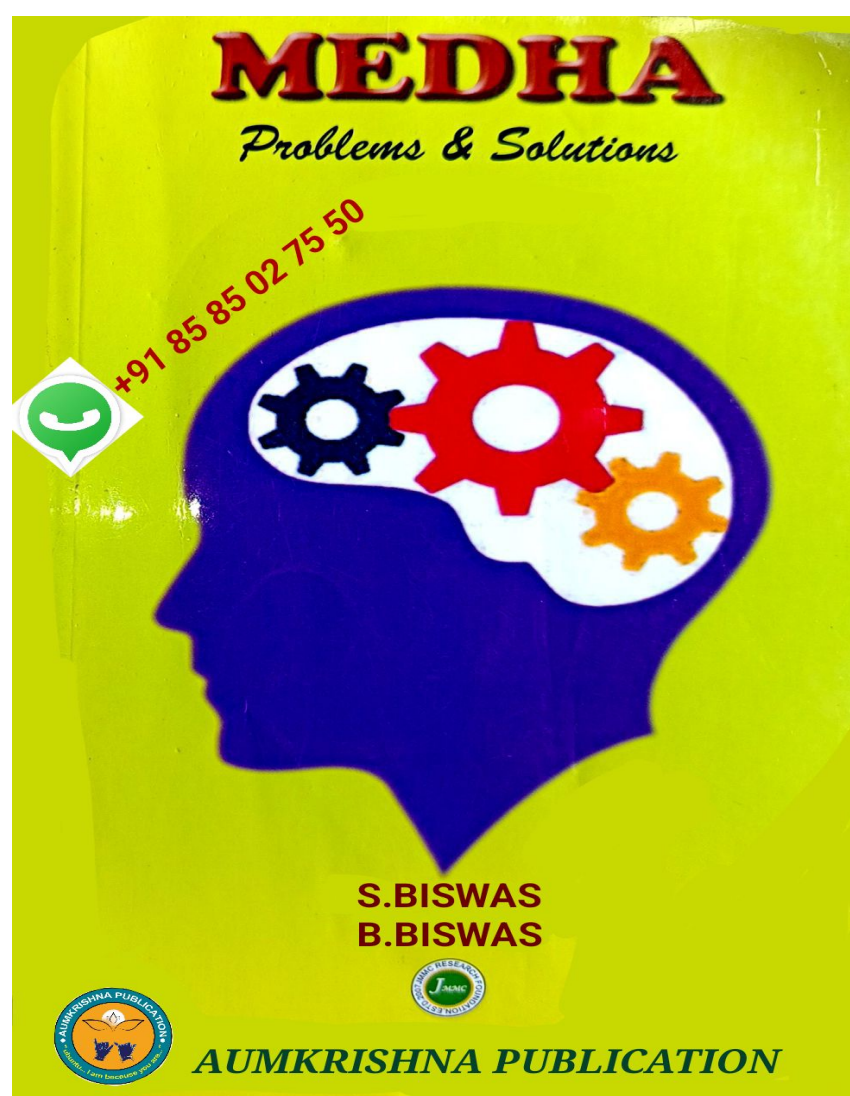
(a) 64 (b) 48 (c) 54 (d) 72

9. Given is $2x = 4y = 8z$ and $xyz = 288$. What is the value $\frac{1}{2x} + \frac{1}{4y} + \frac{1}{8z} = ?$

(a) $\frac{18}{74}$ (b) $\frac{11}{96}$ (c) $\frac{18}{96}$ (d) $\frac{11}{74}$

10. A worm climbs a vertical bamboo stick 32 cm tall. the worm climbs 3cm in the day and slips 2cm during the night each time. However, there are cavities in the stick at 2cm, 4cm, 16cm from the bottom that would not let the worm slip further. If the worm climbs only during the day time and slips only during the night, on which day from the start will it reach the top?

(a) 29 days (b) 28 days (c) 27 days (d) 26 days





Catch me if you can

Classes (XI-XII)

1. Let S denote the set of all value of, a for which the roots of the equation $(1+a)x^2 - 3ax + 4a = 0$ exceed 1, then S equals

(a) $(-16/7, 0)$ (b) $(-16/7, -1)$
(c) $(-1, 2)$ (d) $(-1, 3)$

2. On the portion of the straight line $x + y = 2$ which is intercepted between the axes, a square is constructed, away from the origin, with this portion as one of its side. If p denotes the perpendicular distance of a side of this square from the origin, then the maximum value of p is

(a) $2\sqrt{3}$ (b) $3\sqrt{2}$ (c) $2/\sqrt{3}$ (d) $3/\sqrt{2}$

3. For a given pair of values x and y satisfying $x = \sin \alpha$, $y = \sin \beta$, there are four different values of $z = \sin(\alpha + \beta)$ whose product is equal to

(a) $x^2 - y^2$ (b) $x^2 + y^2$
(c) $(x^2 + y^2)^2$ (d) $(x^2 - y^2)^2$

4. S_n , the sum to n terms of the series

$$(n^2 - 1^2) + 2(n^2 - 2^2) + 3(n^2 - 3^2) + \dots \text{ is}$$

(a) $\frac{1}{4}n^2(n^2 - 1)$ (b) $\frac{1}{4}n^2(n^2 + 1)^2$
(c) 0 (d) $2n(n^2 - 1)$

5. The number of real solutions of the equation

$$\sqrt{1 + \cos 2x} = \sqrt{2} \sin^{-1}(\sin x), \quad -\pi \leq x \leq \pi \text{ is}$$

(a) 0 (b) 1
(c) 2 (d) none of these

6. The values(x) of m does the system of equation $3x + my = m$ and $2x - 5y = 20$ has a solution satisfying the conditions $x > 0$, $y > 0$ is

(a) $m \in (0, \infty)$ (b) $m \in \left(-\infty, -\frac{15}{2}\right) \cup (30, \infty)$
(c) $m \in \left(-\frac{15}{2}, \infty\right)$ (d) none of these

7. If the line $y = \sqrt{3}x - 3$ cuts the parabola $y^2 = x + 2$ at P, Q and if A be the point $(\sqrt{3}, 0)$, then AP. AQ is

(a) $\frac{2}{3}(\sqrt{3} + 2)$ (b) $\frac{-4}{3}(\sqrt{3} + 2)$
(c) $\frac{4}{3}(2 - \sqrt{3})$ (d) none of these

8. The last two digits in $\sum_{k=1}^{100} k!$ are

(a) 13 (b) 14
(c) 15 (d) none of these

9. The equation $\sin^{-1} x = |x - a|$ will atleast one solution if $a \in$

(a) $\left[1 - \frac{\pi}{2}, 1 + \frac{\pi}{2}\right]$ (b) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
(c) $\left[0, \frac{\pi}{2}\right]$ (d) none of these

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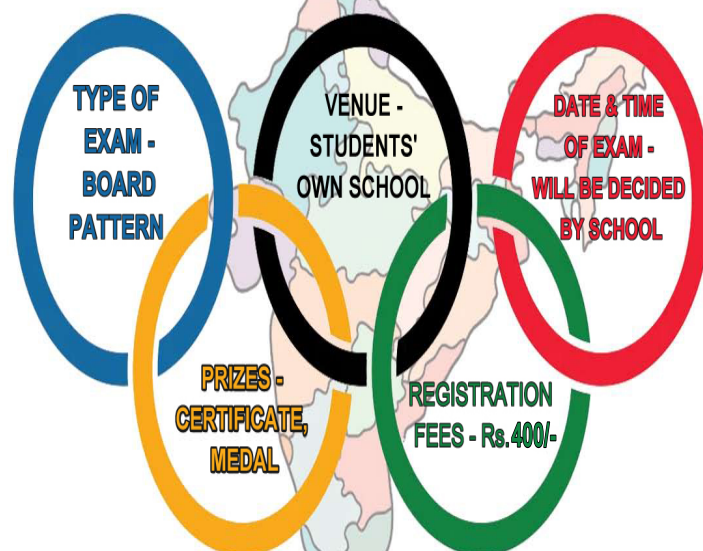
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