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GANITHA CHANDRIKA

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$ax+by=c,$

$3^x+4^y=5^z$

DIOPHANTUS OF ALEANDRIA

3rd Century AD

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విషయ సూచిక

సంపాదకీయం

పాఠకులందరికీ నమస్సుమాంజలి. గణితచంద్రిక తరఫున నూతన సంవత్సర మరియు సంక్రాంతి శుభాభి నందనలు. డిసెంబరు 22వ తేదీ రామానుజన్ పుట్టినరోజు పురస్కరించుకొని దేశమంతా వేడుకలు, గణితకార్యక్రమాలు జరిగాయి. ఇది గణిత ప్రియులందరికీ పండుగ. ప్రస్తుత గణితచంద్రిక Vol. 23, Issue1,2 కలిపి Jan-June 2022 (6నెలలు) సంచికగా ఇవ్వబడుతున్నది. పాఠకులు ఈ విషయం గమనించ ప్రార్థన. గణిత రచయితల నుండి 2 పేజీలకు మించని రచనలు కోరుతున్నాము. విద్యార్థులు, ఉపాధ్యాయులు, గణితప్రియులందరికీ ఇదే మా ఆహ్వానం. ఈ సంచికను చదివి మీ అమూల్య అభిప్రాయాలు తెలియచేయ కోరుచున్నాము.

గణిత అభినందనలతో

Dr. B.B. రామశర్మ
ప్రధాన సంపాదకులు

ముఖచిత్రపరిచయం

DIOPHANTUS OF ALEXANDRIA

3rd Century AD

DIOPHANTUS was a famous Greek Mathematician..His algebraic equations are quite easy and unique, so he was popularly known as the 'Father of Algebra.' He wrote a series of books on Algebra. He later gained popularity for his book Arithmetica, where a brief description with examples was given on the best solution for all the algebraic equations and the theory related to the numbers.

అశ్రునివాళి

శ్రీ కాళ్ళకూరి మహాదేవశర్మ మన అసోసియేషన్‌తో చిరకాల సంబంధం కల్గి, ఎంతో సహకరించారు. ఆయన అనారోగ్యంతో ది. 24-03-2022న స్వర్గస్తులయ్యారని తెలపటానికి విచారిస్తున్నాం. ఉపాధ్యాయునిగా వివిధ పాఠశాలలో విద్యార్థులకు మార్గదర్శనం చేసారు. గణితం, భౌతికశాస్త్ర బోధనలో బోధనోపకరణాల వినియోగం, సులువైన పద్ధతులు అనుసరించేవారు. పనిచేసిన పాఠశాలల్లో విద్యార్థుల అభిమానాన్ని, తోటి ఉపాధ్యాయుల అభినందనను పొందారు. మంచి స్నేహశీలి. ఎ.ఐ.యం.ఇడి నిర్వహించిన వివిధ స్థాయిల్లోని మాథ్స్‌ఫెయిర్స్, టాలెంట్‌టెస్ట్‌ల నిర్వహణలో వారి సహకారం మరువరానిది. సంస్థ భవిష్యత్ కార్యక్రమాల్లో ఆయన లేని లోటు కనిపిస్తుంది. మహాదేవశర్మగారికి సద్గతులు కల్గాలని ఆకాంక్షిస్తున్నాం.

– కార్యనిర్వాహక వర్గం, ఎ.ఐ.యం.ఇడి.

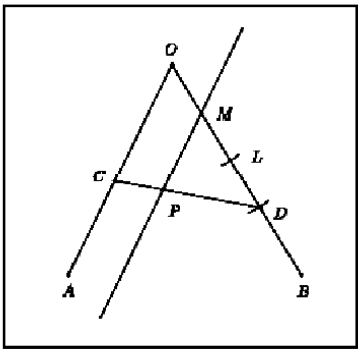
IIT CAPSULE

Dr.B.B.RAMA SARMA

REGIONAL MATHEMATICAL OLYMPIAD - 2017
SOLUTIONS

1. Let AOB be a given angle less than 180° and let P be an interior point of the angular region determined by ∠AOB. Show, with proof, how to construct, using only ruler and compasses, a line segment CD passing through P such that C lies on the ray OA and D lies on the ray OB, and CP : PD = 1 : 2.

Sol. Draw a line parallel to OA through P. Let it intersect OB in M. Using compasses, draw an arc of a circle with centre M and radius MO to cut OB in L, L≠O. Again with L as centre and with the same radius OM draw one more arc of a circle to cut OB in D, D ≠M. Join DP and extend it to meet OA in C. Then CD is the required line segment such that CP : PD = 1 : 2. This follows from similar triangles OCD and MPD.



2. Show that the equation

$a^3 + (a+1)^3 + (a+2)^3 + (a+3)^3 + (a+4)^3 + (a+5)^3 + (a+6)^3 = b^4 + (b+1)^4$ has no solutions in integers a,b.

Sol. We use divisibility argument by 7. Observe the remainders of seven consecutive cubes modulo 7 are 0, 1, 1, 6, 1, 6, 6 in some (cyclic) order. Hence the sum of seven consecutive cubes is 0 modulo 7. On the other hand the remainders of two consecutive fourth powers modulo 7 is one of the sets {0,1}, {1,2}, {2,4}, {4,4}. Hence the sum of two fourth powers is never divisible by 7. It follows that the given equation has no solution in integers.

3. Let $P(x) = x^2 + \frac{1}{2}x + b$ and $Q(x) = x^2 + cx + d$ be two polynomials with real coefficients such that $P(x)\,Q(x) = Q(P(x))$ for all real x. Find all the real roots of $P(Q(x)) = 0$.

Sol. Observe that

$$P(x)Q(x) = x^4 + \left(c+\frac{1}{2}\right)x^3 + \left(b+\frac{c}{2}+d\right)x^2 + \left(\frac{d}{2}+bc\right)x + bd$$

Similarly,

$$Q(P(x)) = \left(x^2+\frac{1}{2}x+b\right)^2 + c\left(x^2+\frac{1}{2}x+b\right)+d$$

$$= x^4 + x^3 + \left(2b+\frac{1}{4}+c\right)x^2 + \left(b+\frac{c}{2}\right)x + b^2 + bc + d$$

Equating coefficients of corresponding powers of x, we otain

$c + \frac{1}{2} = 1$, $b + \frac{c}{2} + d = 2b + \frac{1}{4} + c$, $\frac{d}{2} + bc = b + \frac{c}{2}$, $b^2 + bc + d = bd$

Solving these we obtain $c = \frac{1}{2}$, $d = 0$, $b = \frac{-1}{2}$

Thus the polynomials are

$$P(x) = x^2 + \frac{1}{2}x - \frac{1}{2},\ Q(x) = x^2 + \frac{1}{2}x.$$

Therefore,

$$P(Q(x)) = \left(x^2 + \frac{1}{2}x\right)^2 + \frac{1}{2}\left(x^2 + \frac{1}{2}x\right) - \frac{1}{2}$$

$$= x^4 + x^3 + \frac{3}{4}x^2 + \frac{1}{4}x - \frac{1}{2}$$

It is easy to see that

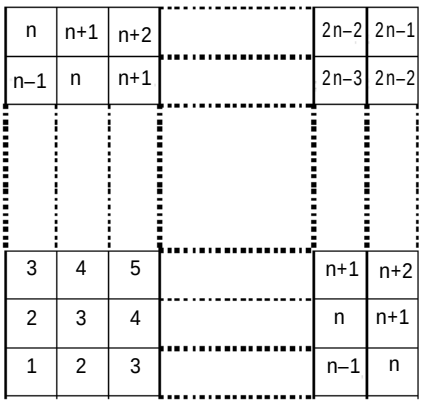
$P(Q(-1)) = 0$, $P(Q(1/2)) = 0$

Thus $(x+1)$ and $(x-1/2)$ are factors of $P(Q(x))$. The remaining factor is $h(x) = x^2 + \frac{1}{2}x + 1$

The discriminant of h(x) is D = (1/4) – 4 < 0. Hence h(x) = 0 has no real roots. Therefore the only real roots of P(Q(x)=0 are – 1 and 1/2.

4. Consider n^2 unit squres in the xy-plane centred at point (i,j) with integer coordinates $1 \le i \le n$, $1 \le j \le n$. It is required to colour each unit square in such a way that when ever $1 \le i < j \le n$ and $1 \le k < l \le n$, the three squares with centres at (i,k), (j,k), (j,l) have distinct colours. What is the least possible number of colours needed ?

Sol. We first show that at least 2n – 1 colours are needed. Observe that squares with centres (i,1) must all have different colours for $1 \le i \le n$; let us call them $C_1, C_2 \ldots C_n$. Besides, the squares with centres (n,j), for $2 \le j \le n$ must have different colours and these must be different from $C_1, C_2 \ldots C_n$. Thus we need at least n + (n – 1) = 2n – 1 colours. The following diagram shows that 2n – 1 colurs will suffice.



5. Let Ω be a circle with a chord AB which is not a diameter. Let T_1 be a circle on one side of AB such that it is tangent to AB at C and internally tangent to Ω at D. Likewise, let T_2 be a circle on the other side of AB such that it is tangent to AB at E and internally tangent to Ω at F. Suppose the line DC intersect Ω at $X \neq D$ and the line FE intersects Ω at $Y \neq F$. Prove that XY is a diameter of Ω.

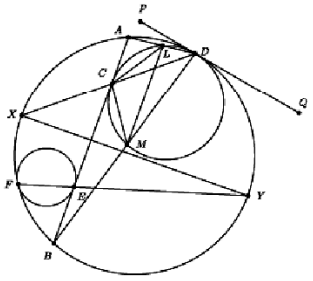
Sol. Draw the tangent PQ at D such that D is between P and Q. Join D to A,B and C. Let L = $DA \cap \tau_1$ and M = $DB \cap \tau_1$ Join C to L and M. Observe that

$$\angle ADP = \angle LMD = \angle ABD \qquad (1)$$

Therefore LM is parallel to AB and hence $\angle LMC = \angle MCB$ (alternate angles), Again observe that

$$\angle ADC = \angle LDC = \angle LMC = \angle MCB = \angle MDC = \angle BDC \quad (2)$$

Thus CD bisects $\angle ADB$. Hence X is the midpoint of the arc AB not containing D. Similarl Y is the midpoint of the arc AB not containing F. Thus the arc XY is half of the sum of two arcs that together constitute the circumference of Ω and hence it is a diameter.



6. Let x,y,z be real numbers, each greater than 1. Prove that

$$\frac{x+1}{y+1}+\frac{y+1}{z+1}+\frac{z+1}{x+1}\leq\frac{x-1}{y-1}+\frac{y-1}{z-1}+\frac{z-1}{x-1}$$

Sol. We may assume that x = max {x,y,z}. There are two cases; $x \geq y \geq z$ and $x \geq z \geq y$. We consider both these cases. The inequality is equivalent to

$$\left\{\frac{x-1}{y-1}-\frac{x+1}{y+1}\right\}+\left\{\frac{y-1}{z-1}-\frac{y+1}{z+1}\right\}+\left\{\frac{z-1}{x-1}-\frac{z+1}{x+1}\right\}\geq 0$$

Theis is further equivalent to

$$\frac{x-y}{y^2-1}+\frac{y-z}{z^2-1}+\frac{z-x}{x^2-1}\geq 0$$

Suppose $x\geq y\geq z$. We write

$$\frac{x-y}{y^2-1}+\frac{y-z}{z^2-1}+\frac{z-x}{x^2-1}=\frac{x-y}{y^2-1}+\frac{y-z}{z^2-1}+\frac{z-y+y-x}{x^2-1}$$

This reduces to

$$(x-y)\frac{\left(x^2-y^2\right)}{\left(x^2-1\right)\left(y^2-1\right)}+(y-z)\frac{\left(x^2-z^2\right)}{\left(x^2-1\right)\left(z^2-1\right)}$$

Since $x \geq y$ and $x \geq z$, this sum is nonnegative,

Suppose $x \geq z \geq y$. We write

$$\frac{x-y}{y^2-1}+\frac{y-z}{z^2-1}+\frac{z-x}{x^2-1}=\frac{x-z+z-y}{y^2-1}+\frac{y-z}{z^2-1}+\frac{z-x}{x^2-1}$$

Thus reduces to

$$(x-z)\frac{\left(x^2-y^2\right)}{\left(x^2-1\right)\left(y^2-1\right)}+(z-y)\frac{\left(z^2-y^2\right)}{\left(y^2-1\right)\left(z^2-1\right)}$$

Since $x \geq z$ and $z \geq y$, this sum is nonnegative

Thus

$$\frac{x-y}{y^2-1}+\frac{y-z}{z^2-1}+\frac{z-x}{x^2-1} \geq 0$$

in both the cases. This completes the proof.

* * *

కష్టాలనే అభేద్యమైన అడ్డుగోడలను చీల్చుకొని ముందుకు సాగేది, సచ్చీలంతో శక్తిని సంతరించుకొన్న సంకల్పబలమే కానీ; ధనం, పేరు ప్రతిష్టలు, పాండితీ ప్రకర్షలు మాత్రం కావు.

– స్వామి వివేకానంద

SOME PROBLEMS ON MENSURATION

S.L.KEERTANA,
B.Tech[N.I.T,A.P]

MENSURATION PRACTICE QUESTIONS

SECTION A

Q1. **The total surface area of a cuboid 16m long, 14 m broad and 7 m high is.....**

A) 434 cm B) 920 cm C) 868 cm^2 D) 886 cm^2

Q 2. **The length of the longest pole that can be placed in a room 12 m long, 8m broad and 9 m high.**

A) 16 m B) 17 m C) 18 m D) 19 m

Q 3. **The volume of a wall, 5 times as high as it is broad and 8 times as long as it is high, is 12.8 cu. meters. The breadth of the wall is.....**

A) 0.04m B) 4m C) 400 cm D) 40 cm

Q 4. **The number of bricks, each measuring 24 cm×12 cm × 8 cm, required to construct a wall 24 m long, 8m high and 60 cm thick if 10% of the wall is filled with mortar is .....**

A) 450 B) 4500 C) 45000 D) 450000

Q5. **The area of the base of a rectangular tank is 6500 cm^2 and the volume of water contained in it is 2.6 cubic meters. The depth of water in the tank is:**

A) 3.5 m B) 4 m C) 5 m D) 6 m

Q6. **Given that one cubic cm of marble weighs 25 gms, the weight of a marble block 28 cm in width and 5 cm thick is 112 kg. The length of the block is:**

A) 26.5 cm B) 32 cm C) 36 cm D) 37.5 cm

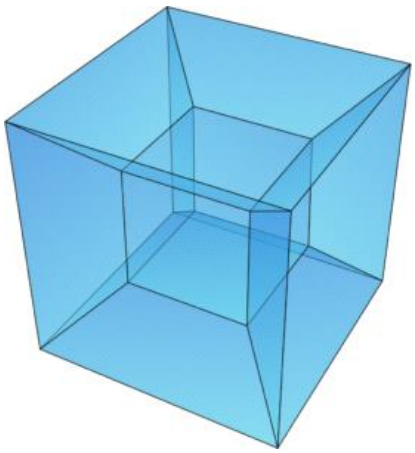
Q7. **Half cubic meter of the gold sheet is extended by hammering so as to cover an area of one hectare. The thickness of the sheet is:**

A) 0.0005 cm B) 0.005 cm C) 0.05 cm D) 0.5 cm

Q8. **In a shower, 5 cm of rain falls. The volume of water that falls on 1.5 hectares of the ground is:**

A) 75 cu m B) 750 cu. m

C) 7500 cu. m D) 75000 cu. m



Find Your Answers Here

1. **(C)** 2. **(B)** 3. **(D)** 4. **(C)** 5. **(B)** 6. **(B)** 7. **(B)** 8. **(B)**

SECTION B

Q1. **Water flows into a tank 200 m × 150 m through a rectangular pipe 1.5 m × 1.25 m @ 20 kmph. In what time (in minutes) will the water rise by 2 meters?**

A) 234 minutes B) 1.2 hours

C) 9 hours D) 96 minutes

Q2. **The dimensions of an open box are 50 cm, 40 cm, and 23 cm. Its thickness is 3 cm. If 1 cubic cm of metal used in the box weighs 0.5 gms. The weight of the box is ...**

A) 6. 08 kg B) 8.04 kg C) 8.06 kg D) 6.04 kg

Q3. **A cube of edge 15 cm is immersed completely in a rectangular vessel containing water. If the dimensions of the base of the vessel are 20 cm × 15 cm. The rise in water level is ..... [RRB 2003]**

A) 11 cm B) 11.11 cm C) 11. 22 cm D) 11.25 cm

Q4. **A conical vessel, whose internal radius is 12 cm and height 50 cm, is full of some liquid. The contents of this vessel are emptied into a cylindrical vessel with an internal radius of 10 cm. The height to which the liquid rises in the cylindrical vessel is .....**

A) 22 cm B) 23 cm C) 24 cm D) 25 cm

Q5. **How many spherical bullets can be made out of a lead cylinder 28 cm high and with base radius 6 cm, each bullet being 1.5 cm in diameter? [RRB 2003]**

A) 1600 B) 1793 C) 1601 D) 1792

Q6. If the radius of a sphere is increased by 50%, The increase percent in the surface area.

A) 95% B) 100 % C) 115% D) 125%

Q7. Two metallic right circular cones having their heights 4.1 cm and 4.3 cm and the radii of their bases 2.1 cm each, have been melted together and recast into a sphere. The diameter of the sphere is .....

A) 4 cm B) 4.1 cm C) 4.2 cm D) 4.3 cm

Q8. A hemispherical bowl of internal radius 9 cm contains a liquid. This liquid is to be filled into cylindrical shaped small bottles of diameter 3 cm and height 4 cm. The number of bottles will be needed to empty the bowl .....

A) 23 B) 34 C) 54 D) 46

Find Your Answers Here

1. **(D)** 2. **(B)** 3. **(D)** 4. **(C)** 5. **(D)** 6. **(D)** 7. **(C)** 8. **(C)**

SECTION C

Directions: Each of the question given below consists of a statement and/or a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statements are sufficient to answer the given question.

Read both the statements and give an answer:

(a) when the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question.

(b) if the data in Statement II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question.

(c) the data either in Statement I or in Statement II alone are sufficient to answer the question.

(d) if the data even in both Statements I and II together are not sufficient to answer the question.

(e) the data in both Statements I and II together are necessary to give the answer.

Q1. What is the weight of the iron beam?

I. The beam is 9 m long, 40 cm wide and 20 cm high.

II. Iron weighs 50 kg per cubic meter.

Q2. What is the volume of 32 meter high cylindrical tank?

[Bank PO 2003]

I. The area of its base is 154 sq. m.

II. The diameter of the base is 14 m.

Q3. What is the volume of a cube?

I. The area of each face of the cube is 64 sq. m.

II. Length of one side of the cube is 8 metres.

Find Your Answers Here

Q1.**(e)** Q2.**(c)** Q3.**(c)**

* * *

Let him who has courage in his mind, love in his heart, come with me.

- Swami Vivekananda

SOME AMAZING MATHS FACTS

B.V.VAIBHAV,
M.Tech[IIIT,Kanchipuram]

1. Zero (0) is the only number which can not be represented by Roman numerals.
2. What comes after a million, billion and trillion? A quadrillion, quintillion, sextillion, septillion, octillion, nonillion, decillion and undecillion
3. Plus (+) and Minus (-) sign symbols were used as early as 1489 A.D
4. 2 and 5 are the only primes that end in 2 or 5
5. An icosagon is a shape with 20 sides
6. Among all shapes with the same perimeter, a circle has the largest area.
7. Among all shapes with the same area, circle has the shortest perimeter
8. 40 when written "forty" is the only number with letters in alphabetical order, while "one" is the only one with letters in reverse order
9. 'FOUR' is the only number in the English language that is spelt with the same number of letters as the number itself
10. From 0 to 1,000, the letter "A" only appears in 1,000 ("one thousand")

11. 12,345,678,987,654,321 is the product of 111,111,111 x 111,111,111. Notice the sequence of the numbers 1 to 9 and back to 1.

12. Have you ever noticed that the opposite sides a die always add up to seven (7)

13. Trigonometry is the study of the relationship between the angles of triangles and their sides

14. Abacus is considered the origin of the calculator

15. Here is an interesting trick to check divisibility of any number by number 3.A number is divisible by three if the sum of its digits is divisible by three (3)

16. Do you know the magic of no. nine (9)? Multiply any number with nine (9) and then sum all individual digits of the result (product) to make it single digit, the sum of all these individual digits would always be nine (9).

17. If you add up the numbers 1-100 consecutively (1+2+3+4+5...) the total is 5050

18. A 'jiffy' is an actual unit of time for 1/100th of a second

19. Have you heard about a Palindrome Number? It is a number that reads the same backwards and forward, e.g. 12421

20. Have you heard about Fibonacci? It is the sequence of numbers wherein a number is the result of adding the two numbers before it! Here is an example: 1, 1, 2, 3, 5, 8, 13, 21, 34, and so on

NATIONAL MATHEMATICS DAY

G. NEERAJ REDDY,
12TH Class, Khammam, T.S

History and Background of National Mathematics Day

History –

The declaration of this day 2012 marked the 125th birth anniversary of Srinivasa Ramanujan.

In 2012, the Indian Government had declared December 22 to be observed as National Mathematics Day every year.

The **year 2012** too was declared **as the National Mathematics Year.**

Objective –

The main objective behind celebrating this day was to spread awareness about the importance of mathematics in the overall development of humanity and society. Also, to focus on the younger generation, who is the future of the country needs to have a positive inclination towards gaining knowledge of mathematics

Significance –

This is **celebrated to honour one of the greatest mathematicians the world has seen**, Sir Srinivasa Ramanujan. With an aim to emphasize the need to **carry forward the legacy of great mathematicians** such as Ramanujan, Aryabhata and Brahmagupta, **to encourage and nurture the glorious tradition of mathematics in the country**, this day is celebrated. On this day, many colleges, schools and Institutes conduct competitions and seminars to guide students towards a brighter future in the field of mathematics.

Apart from Srinivasa Ramanujan, various other mathematicians have contributed a lot in this subject and field. To learn more about these Indian Mathematicians and their Contribution, aspirants can visit the linked article.

Srinivas Ramanujan and His Contributions in Mathematics

- Born in 1887, Srinivasa Ramanujan was a mathematical genius
- Although he had lacked in formal education, at the age of 12 he had excelled in trigonometry and developed many theorems all by himself
- Around 1912, when he came under the influence of Ramaswamy Iyer, the founder of the Indian Mathematical Society, he was given a clerical job. After which, he had started sending his works to International Mathematicians
- In 1913, he finally got his breakthrough after Cambridge-based GH Hardy wrote back to him, after being impressed by his performance
- In 1917, he was elected as a member of the London Mathematical Society
- In 1918, he became a fellow of the Royal Society
- At the age of just 32, in 1920, Ramanujan passed up due to ill health
- However, to this date, his teachings, theorems, and contributions in the mathematical sector are imparted to the younger generation, not just in India, but across the globe.

A GOOD MATHEMATICS BOOK

B. SINDHURA,
B. Tech, M.B.A., Hyderabad

Bhaskaracharya's Bijaganitham

Rs.280

AUTHOR : **Dr. V.B. PANICKER**

PUBLISHER : Bharatiya Vidya Bhavan

LANGUAGE : Sanskrit Text with English Transliteration

EDITION : 2006

ISBN : 8172763913

PAGES : 198

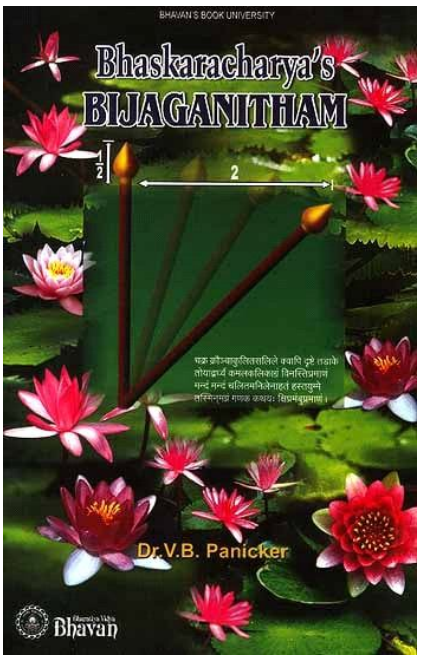
COVER : PAPER BACK

INTRODUCTION

The subject matter of the text Bija Ganitham includes two parts; Basic Operations and Analysis. The basic mathematical operations of addition, subtraction, multiplication and division using positive and negative unknown quantities, operations with zero and surds are explained in the first part. It also includes the solution of indeterminate algebraic equations of the first degree. Some

of these topics appear in 'Lilavathi' also, as they are of interest in arithmetic. The second part of the book is devoted to the solution of algebraic equations of the second degree involving one or more variables. Integer solution of indeterminate equation of the second degree calls for application of intelligence of higher level.

This translation includes the Sanskrit text with translation of the stanzas and detailed explanation. All the problems are fully solved to make the contents understandable. I hope that this will be well received by authorities for assimilation in School curricula of this country.



KVPY EXAMINATION

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Khammam,T.S

KVPY: Know All The Details of Eligibility, Admit Card, Pattern, Result, Cutoff

KVPY means "Kishore Vaigyanik Protsahan Yojana", which is a national fellowship program. This fellowship is granted to the selected students who are interested in pursuing research in basic Science. Indian Institute of Sciences (IISc) Bangalore conducts an aptitude test annually for finding the best students across the country. You are eligible for this program if you are a student from class 11th to 1st year of any undergraduate program in Basic Sciences namely B.Sc./ B.S./B.Stat./B.Math./Int. M.Sc./M.S. in Mathematics, Physics, Chemistry, and Biology.

Before applying and preparing for this program you should have a basic idea about **what is KVPY,** the eligibility for the **KVPY SA SB SX stream**, the cutoff, the application procedure, and KVPY important dates & details, etc. In this article, we will cover all the details from eligibility to cutoff.

KVPY Exam Eligibility Criteria

Students often get confused about what **KVPY SA means, stream SX KVPY means**, and what **KVPY SA SB SX means.** We will discuss it one by one:

Stream SA KVPY

Due to the COVID-19 pandemic, as a one-time measure, students who have passed the 10th Board Examination and are eligible to enrol in the 11th standard (Science subjects) during the academic year 2021-22, are eligible to appear for this Aptitude test.

Although, after the selection as a provisional KVPY fellow, students should produce a study certificate of the 11th class once.

During the interim period of one year, all the selected students will get an invitation to the National Science (Vijyoshi) Camp and KVPY takes care of their travel expenses and local hospitality.

Stream SX KVPY:

Students enrolled in 12th class (Science subjects) during the academic year 2021–22 and aspiring to enrol in Basic Sciences undergraduate programs(B.Sc./B.S./B.Stat./B.Math./ Int. M.Sc./Int. M.S) during the academic year 2022-23.

Students in their 2nd year of study in Cambridge International Examination Board and aspiring to join undergraduate programs in Basic Sciences are eligible too.

Stream SB KVPY

For Stream SB, students who have passed the 12th class Board Examination and are eligible to enrol in the 1st year of B.Sc./B.S./B.Stat./B.Math./Int. M.Sc./Int. M.S. for the

academic year 2021–22 can appear for the aptitude test. The student should produce a study certificate of 1st year B.Sc./B.S./B.Stat./B.Math./Int. M.Sc./Int. M.S once they are selected as a provisional KVPY fellow.

Note: The monetary and other assistance granted under this fellowship stream can be availed only if the student joins an undergraduate course in Basic Sciences (B.Sc./B.S./ B.Stat./B.Math./Int. M.Sc./Int. M.S.) in the academic year 2023-24 after having secured a minimum of 60% (50% for SC/ST/PWD) marks in aggregate in MATHEMATICS and SCIENCE subjects in the XII standard Board Examination.

KVPY 2022 SYLLABUS

Physics, Chemistry, Mathematics, and Biology are the four topics included in the curriculum. We've also covered the syllabus for class 11 in this post, which students will find on our page here. Syllabi for all three current streams – SA, SB, and SX – is recommended by the exam body itself. Students' grades, i.e. 10th/11th/12th/1st year of B.Sc/BS/ B.Stat./B.Math./Int.MSc/MS, are referred to as streams.

KVPY Syllabus for SA

The KVPY SA syllabus for the stream of SA includes subjects and chapters from class X and class XII. The four primary subjects studied in the SA stream are physics, chemistry, biology, and mathematics.

All the four subjects and the important topics with respect to each subject are mentioned below.

Biology: Control and Coordination in Animals and Plants, Heredity and Evolution, Reproduction, Life Processes, Our Environment, Plant Physiology, Diversity of Living Organisms, Cell: Structure and Function, Human Physiology.

Physics: Physical World and Measurement, Gravitation, Thermodynamics, Magnetic Effects of Current, Sources of Energy, Reflection, Refraction, Electromagnetic Induction, Applications in Daily Life, Kinematics, Laws of Motion, Work, Energy, and Power.

Mathematics: Geometry, Introduction to Trigonometry, Statistics, Quadratic Equations, Probability, Surface Areas, and Volumes, Coordinate Geometry, Mathematical Reasoning, Statistics and Probability, Trigonometric Functions, Real Numbers, Polynomials.

Chemistry: States of Matter: Gasses and Liquids, Classification of Elements and Periodicity in Properties, Environmental Chemistry, Chemical Reactions, Metals and Nonmetals, Periodic Classification of Elements, Acids, Bases and Salts, Basic Concepts of Chemistry, Thermodynamics, Carbon Compounds.

KVPY Syllabus for the SB

Along with the class X and XI syllabus, the first-year undergraduate syllabus is also included in the KVPY SB syllabus with respect to each subject. The four subjects, as well as the important topics related to each subject, are mentioned below.

Mathematics: Evaluation of Integrals, Statistics, Surface Areas and Volumes, Vectors and 3D Geometry, Calculus, Real Number, Polynomials, Coordinate Geometry, Mathematical Reasoning, Statistics and Probability, Trigonometric Functions, Linear Programming, Relations and Functions, Analytical Geometry in Two Dimensions, Vector Algebra, Geometry, Introduction to Trigonometry, Quadratic Equations, Probability.

Biology: Genetics, Life Processes, Human Physiology, Plant Physiology, Reproduction, Diversity of Living Organisms, Cell: Structure and Function, Biology and Human Welfare, Biotechnology, Control and Coordination in Animals and Plants, Genetics and Evolution, Our Environment, Ecology, and Environment.

Chemistry: Dienes and Alkynes, Thermodynamics, Chemical Reactions, Basic Concepts of Chemistry, Periodic Classification of Elements, Metals and Nonmetals, Environmental Chemistry, Solid State, Electrochemistry, Chemical Kinetics, Isolation of Elements, Surface Chemistry,

Chemical Bonding, Chemistry of Noble Gasses, Structure and Bonding, Alkenes, Cycloalkenes, Carbon Compounds, Acids, Bases and Salts, States of Matter: Gasses and Liquids, Classification of Elements and Periodicity in Properties.

Physics: Electromagnetic Induction, Physical World and Measurement, Sources of Energy, Refraction and its Applications in Daily Life, Thermodynamics, Reflection, Electrostatics, Current Electricity, Electromagnetic Induction, and Alternating Current, Waves and Optics, Electricity and Magnetism, Electrostatics and Thermal Physics, Kinematics, Laws of Motion, Magnetic Effects of Current, Work, Energy, and Power, Gravitation.

KVPY Syllabus for the SX

Many of the relevant principles, themes, and chapters from classes X, XI, and XII are covered in the KVPY SX syllabus. Chemistry, Biology, Physics, and Mathematics are all covered in the syllabus, just as they are in the SA stream. All is the same, except for the SX stream, the KVPY syllabus for class 12 has been added.

The four subjects, as well as the important topics related to each subject, are mentioned below.

Mathematics: Real Number, Polynomials, Introduction to Trigonometry, Surface Areas and Volumes, Trigonometric Functions, Geometry, Linear Programming, Vectors, and 3D

Geometry, Calculus, Relations and Functions, Coordinate Geometry, Mathematical Reasoning, Statistics, and Quadratic Equations, Statistics, and Probability.

Biology: Cell: Structure and Function, Genetics and Evolution, Human Physiology, Biology, and Human Welfare, Control and Coordination in Animals and Plants, Ecology and Environment, Life Processes, Plant Physiology, Diversity of Living Organisms, Reproduction.

Chemistry: Surface Chemistry, States of Matter: Gasses and Liquids, Metals and Nonmetals, Carbon Compounds, Basic Concepts of Chemistry, Thermodynamics, Classification of Elements and Periodicity in Properties, Chemical Reactions, Environmental Chemistry, Solid State, Electrochemistry, Chemical Kinetics, Isolation of Elements, Periodic Classification of Elements.

Physics: Magnetic Effects of Current, Reflection of Light, Electromagnetic Induction, Kinematics, Work, Energy and Power, Sources of Energy, Thermodynamics, Electrostatics, Refraction, Current Electricity, Electromagnetic Induction, and Alternating Current, Physical World, and Measurement, Gravitation, Laws of Motion.

KVPY BEST BOOKS

There is a list given below in which the best books to refer for preparation of the KVPY examination are given. The

syllabus in these books is the same as the KVPY's latest syllabus. All these books are very handy as it features all the essential things that are required for preparing the examinations at its best.

The subject and the name of the book is listed below:

Physics - Fundamentals of Physics by David Hally and Concepts of Physics by DC Pandey.

Chemistry - NCERT Physical and Organic Chemistry by OP Tandon and Modern ABC of Chemistry by Modern Publishers

Mathematics - NCERT Class 11 and Class 12 and Mathematics for Class 11 by RD Sharma.

Biology - Elementary Biology by Trueman and NCERT Books class 11 and Class 12.

KVPY Exam Application Process

After knowing what the **KVPY exam means**, it is time to go through the application process. KVPY Exam mode is online. Payment can be made via Net Banking, Credit Card, or Debit Card. Here are the step by step guidelines to apply for the KVPY application: Go to the KVPY website.

KVPY Selection Process

The candidate has to clear two stages for securing a KVPY fellowship. These stages are:

Aptitude Test :

All eligible candidates can give an aptitude test at their chosen exam centres. In this test, questions related to reasoning and analytical abilities are asked to assess the candidates.

Candidates must attempt any three sections in 1 st Part, and any two sections of 2nd Part for the SB/SX stream.

Candidates can give this exam in either Hindi or English language as per their convenience.

Note: In addition to the admit card, students must bring a valid School/College ID or Aadhar Card or Passport with a clear photograph.

Interview

All shortlisted candidates will be called for an interview at the venue.

The Candidate's deep knowledge and passion for science and research will be tested further during the interview process.

Documents Required for the Interview Round are:

A category certificate (if required)
Self-evaluation Form
Recommendation letter from your teacher
Interview call letter
Self-attested copies of class 10th and 12th mark sheet
Study certificate
Medical certificate (if asked).

After clearing these two stages, candidates will receive this prestigious scholarship.

KVPY Remuneration

The candidate from SA/SX/SB streams will be awarded the following monetary assistance:

During 1st to 3rd years of - B.Sc./B.S./B.Stat./B.Math. / Integrated M.Sc. /M.S.

Monthly Fellowship: INR 5,000

Annual Contingency Grant: INR 20,000

During the 4th to 5th years of - B.Sc./B.S./B.Stat./B.Math. / Integrated M.Sc. /M.S.

Monthly Fellowship: INR 7,000

Annual Contingency Grant: INR 28,000

Conclusion

If you want to appear for the KVPY exam, make sure to be aware of all the details like **what is KVPY** as KVPY has different eligibility for the KVPY SA stream, SB stream, and SX stream. Overall, the KVPY exam is deemed tougher than the JEE because of the depth of knowledge required for this fellowship. The proper knowledge and strategy can help you pass this program. Hopefully, this well-written article has covered all about what **KVPY SA SB SX means** and other vital information.

A PROBLEM FROM RAMANUJAN

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Ramanujan's Nested Radical Problem

$$\sqrt{1+2\sqrt{1+3\sqrt{1+4\sqrt{1+5\sqrt{1+\ldots}}}}}$$

Left: Srinivasa Ramanujan. Right: The problem posed by Ramanujan in the Journal of the Indian Mathematical Society.

In 1911, the Indian mathematical genius Srinivasa Ramanujan posed the above problem in the Journal of the Indian Mathematical Society. After waiting in vain for a few months, he himself provided a solution to the same!

SOLUTION

Note that for any non-negative real number x, we have —

$$x+1=\sqrt{(x+1)^2}$$

$$\Rightarrow \quad x+1=\sqrt{1+2x+x^2}$$

$$\Rightarrow \quad x+1=\sqrt{1+x(x+2)}$$

Now, (x + 2) can again be written as ((x + 1) + 1), to get —

$$x+1=\sqrt{1+x\left((x+1)+1\right)}$$

$$\Rightarrow \quad x+1=\sqrt{1+x\sqrt{\left((x+1)+1\right)^2}}$$

$$\Rightarrow \quad x+1=\sqrt{1+x\sqrt{1+2(x+1)+(x+1)^2}}$$

$$\Rightarrow \quad x+1=\sqrt{1+x\sqrt{1+(x+1)(x+3)}}$$

Carrying on with the process and writing (x + 3) as ((x + 2) + 1), we get —

$$x+1=\sqrt{1+x\sqrt{1+(x+1)\left((x+2)+1\right)}}$$

$$\Rightarrow \quad x+1=\sqrt{1+X\sqrt{1+(X+1)\sqrt{\left((X+2)+1\right)^2}}}$$

$$\Rightarrow \quad x+1=\sqrt{1+X\sqrt{1+(X+1)\sqrt{1+2(X+2)+(X+2)^2}}}$$

$$\Rightarrow \quad x+1=\sqrt{1+X\sqrt{1+(X+1)\sqrt{1+(X+2)(X+4)}}}$$

$$\Rightarrow \quad x+1=\sqrt{1+X\sqrt{1+(X+1)\sqrt{1+(X+2)\sqrt{\left((X+3)+1\right)^2}}}}$$

The pattern is pretty visible by now. It's clear that if we carry on this process infinitely, we'd land at —

$$X+1=\sqrt{1+X\sqrt{1+(X+1)\sqrt{1+(X+2)\sqrt{1+(X+3)\sqrt{1}}}}}+\ldots$$

Now comes the magic! Plugging in $x = 2$, we get —

$$3 = \sqrt{1+2\sqrt{1+3\sqrt{1+4\sqrt{1+5\sqrt{1+....}}}}}$$

There we have it! The solution to our problem turns out to be just 3 !! Simple and plain as that. Indeed —

It's hard not to wonder at the remarkable stroke of genius at the heart of this solution. Who would have thought that representing a number as the square root of its square could lead to such a beautiful identity?

Also, the above serves as an excellent example of a broader category of problems — wherein the problem posed is a particular case of more general identity. In such cases, we discover the general identity first and then plug in suitable values to get the desired result. For example, we can now easily say that —

$$125 = \sqrt{1+124\sqrt{1+125\sqrt{1+126\sqrt{1+127\sqrt{1+....}}}}}$$

So, that was Ramanujan's solution to the problem.

Some Problems from MSET- 2018

CLASS - V

1. **How many three digit numbers can be formed by using the digits 3, 7, 0, 5 if repetitions of the digits is allowed:**
   1) 18 2) 27 3) 36 4) 48
2. **Which letter in the following represent Acute angle?**
   1) H 2) L 3) V 4) F
3. **The angle between two hands in a clock at 5'O clock is ....**
   1) Acute angle 2) Obtuse angle
   3) Right angle 4) Reflex angle
4. **If P: 555+125-230 = 450 and Q: 320-115+245 = 450 then ...**
   1) P only is true 2) Q only is true
   3) P and Q are true 4) P and Q are False
5. **13 times a number is added to the number to get 112. Then the numbere is**
   1) 4 2) 9 3) 6 4) 8
6. **Length of a match box is 4cm, bredth 3cm. How many match boxes can be arranged in a box of length 80cm, breadth 60cm. in single layer ...**
   1) 360 2) 400 3) 240 4) 300
7. **Sum of two numbers is one fourth of their product. The numbers are ...**
   1) 9, 12 2) 12, 16 3) 16, 14 4) 12, 6
8. **For what values of 'x' and 'y' the number 2x4y8 is the smallest number:**
   1) (2, 0) 2) (0, 2) 3) (1, 0) 4) (0, 1)

9. If BAT $\rightarrow$ YZG and POT $\rightarrow$ KLG then RULE $\rightarrow$ .....

1) JGPW 2) HENU 3) GJOU 4) IFOV

10. If BOX - PEN = CAB; BOOK - BAG = MAS then FOX-PIG = ...

1) CEE 2) CEC 3) BACK 4) ICE

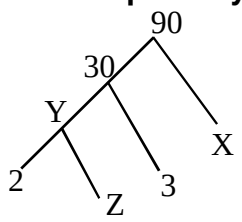
11. Which letter comes next in the series: B D G K .....

1) O 2) Q 3) P 4) R

Observe the factors tree of 90

12. The missing numbers x, y and z are respectively:

1) 3, 10, 5
2) 3, 5, 10
3) 10, 3, 5
4) 10, 5, 3



13. A Robo stood on a number line at 'O', took 5 steps towards right, then took 10 steps towards left, then again taken three steps towards right then at which number is that Robo:

1) 2 2) -2 3) -8 4) -3

14. There are 220 roses in a garden. If one rose out of every 13 roses is spoiled, then the total number of spoiled roses is :

1) 17 2) 16 3) 18 4) 15

15. In a square sheet a sqaure of area 144 sq. cm is drawn. Then all possible rectangles of the same area are drawn on similar square sheets. Number of such Rectangles is:

1) 7 2) 8 3) 6 4) 9

CLASS - VI

1. Which of the following statements is true ?

i) All primes are odd,

ii) All natural numbers are whole numbers

1) Only (i) 2) Only (ii)

3) (i) and (ii) 4) neither (i) nor (ii)

2. The number that differs from others is

1) 11 2) 7 3) 2 4) 5

3. Ray : 1 :: Line segment :-

1) 1 2) 2 3) 3 4) 4

4. Estimation value of 896 x 798

1) 72000 2) 715008

3) 720000 4) 637500

5. 1 x 8 + 1 = 9; 12 x 8 + 2 = 98; 123 x 8 + 3= 987 then 1234567x 8 + 7 =

1) 9876543 2) 98765432

3) 987654 4)987654321

6. Ravi brought 15 boxes each containing 127 sweets, and distributed to 375 students each 5. Then the number of sweets that are left.....

1) 30 2) 40 3) 50 4) 20

7. The greatest number that divides 150, 196, 120 leaving reminders 6, 4 and 8 respectively is

1) 16 2) 12 3) 8 4) 6

8. Two numbers are in the ratio 3 : 4; their H.C.F is 6 Then L.C.M =

1) 48 2) 144 3) 72 4) 12

9. Angle made by minutes hand in one minute is

1) $\frac{1}{2}°$ 2) 5° 3)6° 4) $5\frac{1}{2}°$

10. To find correct measurement of a line segment we must use :

1) Scale 2) Protractor

3) Divider 4) Set square

11. A cow is tied with a rope outside at the corner of a receangular shed. The shape of the region that the cow gazes :

1) Rectangle 2) Triangle

3) Circle 4) Sector

12. $l \parallel m$, $m \perp n$, $n \parallel p$ then

1) $l \parallel p$ 2) $l \perp p$

3) l and m coinside 4) $m \parallel p$

13. Sum of two positive integers is 216. and their HCF is 27. Number of such pairs :

1) 1 2) 2 3) 3 4) None

14. If 0.75 : x :: 5: 8, then x =

1) 1.12 2) 1.20 3) 1.25 4) 1.30

15. a - [a - b + {b - c - (a - c)}] =

1) 2(a - b) 2) 0 3) a - b 4) a

CLASS - VII

1. **A regular Prism, whose faces, edges amd vertices are 5, 9 and 6 respectively is**
   1) Rectangular Prism 2) Square Prism
   3) Triangular Prism 4) None

2. **If the sub-triplicate ratio of a given ratio is 8: 27 then the given ratio is**
   1) 2 : 3 2) $8^3 : 27^3$ 3) $8^2 : 27^2$ 4) 3 : 2

3. **In the letters A.I.M.Ed, the sum of the exterior angles in the letter 'A' as appears in it is equal to 220° then the angle at the vertex is**
   1) 110° 2) 70° 3) 40° 4) 60°

4. **From a 9'6'' length of a stick, 2'8'' length of stick was removed. Then the length of the remaining stick is**
   1) 6'8'' 2) 7'2'' 3) 6'10'' 4) 7'8''

5. **The point 'C' divides the line segment AB of length 24cms such that the length of CB = 15cms. Then the ratio of the length of line segments AB : AC is**
   1) 3 : 5 2) 3 : 8 3) 8 : 3 4) 5 : 3

6. **No. of lines that can be drawn through 'n' non - collinear points is**
   1) $\frac{n(n+1)}{2}$ 2) $\frac{n(n-1)}{2}$ 3) $\frac{(n+1)}{2}$ 4) $\frac{(n-1)}{2}$

7. **Two persons "A" and "B" bought some pens for `200/- and `500/- respectively and sold them for `240/- and `575/- respectively. Who gained more**
   1) B 2) A 3) Both gain equally 4) Can't decide

8. **Dividend property of proportion among the follwoing if a : b :: c : d then**
   1) b : a :: d : c
   2) a : c :: b : d
   3) (a + b) : b :: (c + d) : d
   4) (a - b) : b : : (c - d) : d

9. **Sum of any two primes is even. This statement is**
   1) Always true
   2) Always false
   3) always true except for the prime 2
   4) Can't decide

10. **If x : y = 3 : 2 then (2x+3y) : (3x+2y)=**
    1) 12 : 19 2) 12 : 20 3) 3 : 4 4) 12 : 13

11. **12 men working 8hrs a day can complete a work in 10days. To complete the same work in 8 days, working 15 hrs a day, the number of men required**
    1) 4 2) 5 3) 6 4) 8

12. **4km + 4m + 4cm = ... km**
    1) 4.004004 2) 4.0404
    3) 4.00404 4) 4.04004

13. **The value of z in the series 11, 10, 101, 100, x, y, z**
    1) 1001 2) 10001 3) 100001 4) 10000

14. **In an entrance examination 60% marks are required to get a seat. Gopi got 232 marks and lost his seat by 8 marks. Maximum marks of the test**
    1) 500 2) 600 3) 400 4) 300

15. **The statitician who worked on 'Cramer - Rao Inequality' and 'Fisher - Rao Theorem' is.**
    1) R.S.Rao 2) A.N.Rao 3) C.R.Rao 4) P.V.Rao

CLASS - VIII

1. Less than Ogive is a ...

1) Straight line 2) Falling curve
3) Raising curve 4) Polygon

2. $0.\bar{2} + 0.\bar{3} + 0.\bar{4}$ = ...

1) $0.\overline{09}$ 2) 9/10 3) 1 4) $0.0\bar{9}$

3. The square root of $41-\sqrt{21+\sqrt{19-\sqrt{9}}}$ is....

1) 6 2) 9 3) 30 4) 36

4. The third proportion for $(a^2 - b^2)$ and $(a + b)$ is

1) a - b 2) a + b 3) $a^2 + b^2$ 4) $\frac{a+b}{a-b}$

5. A square field with side 30m is surrounded by a path of uniform width. The area of the path is 256 sq.m. then width of the path is

1) 4m 2) 3m 3) 2m 4) 1m

6. A rational number between -5 and +3 is

1) $\sqrt{4}$ 2) $\sqrt{12}$ 3) $\sqrt{13}$ 4) $\sqrt{14}$

7. $a \neq b \neq c \neq d$ are four +ve integers such that $a^3 + b^3 = c^3 + d^3$, then each of the sum is equal to

1) 6174 2) 1729 3) 1887 4) 1972

8. If 50% of (a - b) = 30 % of (a + b), then what % of 'a' is 'b'?

1) 20% 2) 25% 3) 15% 4) 40%

9. If $2^a x 3^b = 576$ then $\frac{a}{b}$ is ....

1) 2 2) 3 3) $\frac{1}{2}$ 4) $\frac{1}{3}$

10. A sum of money amounts to Rs. 6690 after 3 years and to Rs. 10,035 after 6 years on Compound interest. Then the sum is (in Rs.)

1) 4,500 2) 4,460
3) 6,400 4) 4,600

11. The method of drawing enlarged or reduced similar figures is called

1) Tessellation 2) Symmetry
3) Dialation 4) Order of symmetry

12. Rs 1210 were divided among A,B,C so that A:B=5:4 and B:C=9:10, then C gets....

1) Rs. 340 2) Rs.400
3) Rs.450 4) Rs.475

13. Find the number that differs with others 1, 5, 14, 30, 50, 55, 91.

1) 5 2) 50 3) 55 4) 91

14. If $15.7\overline{32}$ is expressed in the form of p/q then p-q = ...

1) 14855 2) 14785 3)14585 4) 13685

15. Solution for $\frac{5x+2}{2x+3} = \frac{12}{7}$ is ..

1) 4 2) 2 3) 0 4) -1

CLASS - IX

1. If $\frac{x+y}{z} = -1$ then $\sqrt{\frac{x^2}{yz} + \frac{y^2}{zx} + \frac{z^2}{xy} - 2}$ is equal to

1) 1 2) $\sqrt{3}$ 3) $\sqrt{2}$ 4) 0

2. $\sqrt{6+\sqrt{6+\sqrt{6+\sqrt{\ldots\ldots\infty}}}} = y+1$ then $\frac{y-1}{y+3}$ =.....

1) $\frac{1}{5}$ 2) $\frac{1}{3}$ 3) $\frac{1}{4}$ 4) 0

3. A rectangle of integral sides has sum of diagnoals equal to 20. Its perimeter may be _____

1) 81 2) 42 3) 28 4) 36

4. Missing term in the sequence 103, 107, 113, 121, 131,.....157, 173 is of the diagital form abc then c+a-b = _____

1) 1 2) 3 3) 0 4) -1

5. If $xy = 2^6$, $yz = 6^4$, $zx = 4^3$ then 9x = _____

1) 4^2 2) 8^3 3) 3^4 4) 3^6

6. (x - a)(x + 8) + 1=0, x and a are integers then a =

1) -10 or -6 2) 10 or 6 3) 10 or -6 4) -10 or 6

7. Maximum number of points in which 2 circles and 2 stright lines can meet in any way is _____

1) 11 2) 10 3) 8 4) 4

8. The smallest multiple of 9 of the following which contains no odd digit is____

1) 288 2) 144 3) 72 4) 2880

9. **$n^2 - 440$ is a perfect square for *x* choices of n then *x* =_____**

1) 3 2) 4 3) 5 4) 0

10. **Ramanujan became**

A) first Indian elected fellow of Trinity college

B) Second Indian elected fellow of the Royal Society

Then the true statement

1) A only 2) B only

3) A and B 4) Neither A nor B

11. **The year that is declared as " Year of Mathematics" by Government of India**

1) 2000 2) 2012 3) 2011 4) 2010

12. **The word "Geometry" is derived from the Greek words**

1) Geo, Metra 2) Geo, Metrein

3) Geo, Metran 4) Geon, Metri

13. **(-x, y) is a point in the 4th quadrant, then (x,y) lies in**

1) Q_1 2) Q_2 3) Q_3 4) Q_4

14. **Area of the quadrilatral formed by joining the points (-1, 0), (-1, 3), (1, 3) and (1, 0) in order .... (sq.units)**

1) 3 2) 6 3) 9 4) 12

15. **In the congruence of triangles, this is not true**

1) SAS 2) ASA 3) AAA 4) SSS

CLASS - X

1. If $2^{x+y} \cdot 3^{y+z} \cdot 5^{z+x} = 360$ then $X^2 + Y^2 + Z^2 =$

1) 5 2) 16 3) 3 4) 36

2. If $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ is A.M. of a and b then $n^2 - 5n + 3 =$ .....

1) 2 2) 3 3) 4 4) 0

3. 148th number of the series 1, 3, 6, 10, 15, 21, ...

1) 12870 2) 11026 3) 21786 4) 27826

4. If 3 Sin A + 4 Cos A = a then $25 - (4 \text{ SinA} - 3 \text{ CosA})^2$ = ...

1) a^2 2) $a^2 - 25$ 3) $25 - a^2$ 4) $50 - a^2$

5. Number of ways to write 100 as product of two relatively prime natural numbers is...

1) another prime number 2) another odd but not prime
3) perfect number 4) perfect cube number

6. A cylinder and a cone are on same base and have same height 2018 units. Their volumes are in the ratio .....

1) 2 : 3 2) 3 : 1 3) 1 : 1 4) 2018 : 1

7. Which of the following medals is prestigious in the subject of mathematics?

1) Field's medal 2) Arjuna medal
3) Noble medal 4) Kelvin medal

8. If x, y, z are distinct real numbers such that $x+\frac{1}{y}=y+\frac{1}{z}=z+\frac{1}{x}$ then $x^2y^2z^2$ = ...

1) 2 2) 4 3) 3 4) 1

9. If A={x/x^2+3x-4=0}, B={x/x^2+3x+2=0} then A - B = ...

1) {-1,-1} 2) {-4,-2} 3) A 4) { } or ϕ

10. If $\frac{\log_2 x}{4}=\frac{\log_2 y}{6}=\frac{\log_2 z}{3k}$ and $x^3y^2z=1$ then k = ...

1) -8 2) 8 3)-6 4)can not be find

11. ABCD is a quadrilateral in which the angle bisectos of $\angle A$ and $\angle B$ meet at P. Then $\angle C + \angle D$ = ...

1) $3\angle APB$ 2) $2\angle APB$ 3) $\angle APB$ 4) $4\angle APB$

12. The first use of the idea of ' Sine' as we use it today was found in the book.

1) The Elements 2) Aryabhatiyam
3)Almagest 4)Encyclopedia Mathematica

13. The word ' tangent' came from a Latin word 'tangere' was introduced by .....

1) Gauss 2) Aryabhatta
3)Thomas Fineke 4)Thales

14. The sum of the length, breadth and depth of a cuboid is 19cm. and its diagonal is $5\sqrt{5}$ cm. Its total surface area is (in cm^2).....

1) 118 2) 236 3) 361 4)486

15. Find out the wrong term in the series 5, 8, 22, 42, 124, 244, 736.....

1) 8 2) 22 3) 42 4) 244

వారసులం - గణితశాస్త్ర సాధకులం
పరిశోధకులం - గణితానికి ప్రేమికులం

We live in maths We solve maths
We live in maths We love maths

ఆపస్తంబ ఆలోచన ... ఆ ...
బౌధాయన వివీచన ... ఆ...
ఆపస్తంబ ఆలోచన కలిగించే మనోవాటి
బౌధాయన వివీచనకి పులకించిన ధాత్రి
ఆ ఆలోచన, వివీచన కొనసాగించే ॥వారసులం॥

ఆర్యభట్ట గణనలు ... ఆ...
భాస్కరుని భోధనలు ... ఆ...
ఆర్యభట్ట గణనలు చూపెను ఆదర్శం
భాస్కరుని బోధనలు చేసెను ఆదేశం
ఆ ఆదేశం, ఆదర్శం కొనసాగించే ॥వారసులం॥

మహావీర మధురత్వం ... ఆ...
బ్రహ్మగుప్త భావార్థం ... ఆ...
మహావీర మధురత్వం గణితసార సంగ్రహం
బ్రహ్మగుప్త భావార్థం బ్రహ్మసూత్ర సిద్ధాంతం
ఆ మధురత్వం, భావార్థం కొనసాగించే ॥వారసులం॥

శ్రీధరుని సోధన ... ఆ...
శ్రీనివాస సాధనా ... ఆ ..
శ్రీధరుని సోధన సమీకరణ మూలము
శ్రీనివాస సాధన ఇచ్చెను సందేశము
ఆ సోదరుల, సాధనలు కొనసాగించే ॥వారసులం॥
లక్కోజూ రాగము ... ఆ...
శకుంతల వేగము ... ఆ ...
లక్కోజూ రాగము పెంచెను విశ్వాసము
శకుంతల వేగము ఆపురూప విజయము
ఆ విశ్వాసం, విజయాలు కొనసాగించే ॥వారసులం॥

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శ్రీ విజ్ఞానవిహార్ ఇంగ్లీషు మీడియం హైస్కూల్, విజయవాడ విద్యార్థులచే You Tube నుండి గ్రహించబడినది.

Key to MSET = 2018 Questions

Class	Questions														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
V	4	3	2	3	4	2	4	4	4	1	3	1	2	2	1
VI	2	3	2	3	1	1	1	3	3	3	4	2	3	2	4
VII	3	2	2	3	3	2	2	4	3	4	4	3	2	3	3
VIII	3	3	1	4	3	1	2	2	2	2	3	2	2	3	2
IX	1	1	3	3	1	1	1	1	2	3	2	2	3	2	3
X	1	2	2	1	1	2	1	4	3	1	2	2	3	2	4

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