C.S. DAV PUBLIC SCHOOL, MOTIHARI.

MATHS CLASS-X

1 MARK TYPE QUESTIONS

1. If a and b are two prime numbers then find HCF of a and b and LCM of a and b.

2. If the rational number x/y has a terminating decimal expansion, what is the condition to be satisfied by y?

3. State Euclid's division lemma.

4. Write one Irrational number between 2 and 3.

5. Find the common difference of 1/7, (1-7x) /7, (1-14x)/7 ………..

6. Give an example of two Irrational numbers whose sum is rational number.

7. Find the arithmetic mean between (a-b)and (a+b).

8. Find a point on x-axis which is equidistant from points A(-1,0) and B(5,0).

9. State the basic proportionality Theorem.

10. Find the height of an equilateral triangle of side 12 cm.

11. The chord of a circle of radius 10 cm. subtends a right angle at the centre. Find the length of the chord.

12. Write the value of $(1+\cot^2\theta) \sin^2\theta$.

13. If $\csc\theta= \sqrt{10}$, then find the value of $\sec\theta$.

14. The area of a square field is 0.5 hectare. Find the length of its diagonal in metre.

15. If the area of an equilateral triangle is $4\sqrt{3} \text{ cm}^2$, then find its perimeter.

16. The circumference of a circle exceeds its diameter by 45 cm. Find the circumference of the circle.

17. A letter of the English alphabet is chosen at random. Determine the probability that the chosen letter is a CONSONANT.

18. The length of the minute hand of a clock is 21 cm. Find the area swept by the minute hand in 10 minutes.

19. If the mean of a data is 27 and its median is 33, then find the mode.

20. In a family of three children, find the probability of having at least one boy.

2 MARKS TYPE QUESTIONS

1. If $a\cos\theta -b\sin\theta =c$,prove that $a\sin\theta +b\cos\theta = \pm \sqrt{a^2 +b^2 -c^2}$.

2. Sum of the areas of two squares is 400 cm^2. If the difference of their perimeters is 16 cm, find the sides of the two squares.

3. A chord PQ of a circle of radius 10 cm. subtends an angle 60° at the centre of a circle. Find the area of major and minor segments of the circle.

4. The radius and height of a solid right circular cone are in the ratio of 5:12. If its volume is 314 cm^3, find its total surface area.

5. Prove that $3\sqrt{2} -1$ is an irrational number.

6. Show that any number of the form 6^n , where n belongs to N can never end with the digit 0.

7. If $p^x =q$, $q^y =r$, and $r^z =p$, then find (xyz).

8. If the zeros of the polynomial $x^3 -3x^2+x+1$ are a-b, a and (a+b) , find the values of a and b.

9. If α and β are the zeros of the polynomial $2x^2+7x+5$. Write the value of $α + β +αβ$.

10. The difference of two natural numbers is 5 and the difference of their reciprocals is 3/28. Find the numbers.

11. Solve $x^2-4ax+4a^2-b=0$

12. If $(\sqrt{3})^5 \times 9^2 = 3^n \times 3\sqrt{3}$, then find the value of n.

13. How many three digit numbers are divisible by 9.

14. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

15. ABC is a right triangle in which $∠C=90°$ and CD is perpendicular to AB. If BC=a, CA=b, AB=c, and CD=p then prove that cp=ab.

16. Two concentric circles of radii a and b (a>b) are given. Find the length of the chord of the larger circle which touches the smaller circle.

17. If sec2A=cosec $(A-42°)$, where 2A is an acute angle, find the value of A.

18. Prove that $\tan 1° \tan 2° \tan 3° \ldots \tan 89° =1$.

19. The slant height of the frustum of a cone is 4 cm. and the perimeters of its circular ends are 18 cm. and 6 cm. Find the curved surface area of the frustum.

20. Two customers are visiting a particular shop in the same week. Each is equally likely to visit the shop on any one day as on another. What is the probability that both will visit the shop on

a)Different Days?   b) Consecutive Days?

3 MARKS TYPE QUESTIONS

1. Find the value of k, when x^3+2x^2+kx+3 is divided be x-3 then the remainder is 21.

2. A child puts one 5 - rupee coin of her savings in the piggy bank on the first day. She increases her savings by one 5 - rupee coin daily. If the piggy bank can hold 190 coins of 5 rupees in all, find the number of days she can contribute to put the 5 - rupee coins into it and find the total money she saved/

3. If 5+13+21+……+x =2139, find the value of x.

4. Find the value of k for which the system of equation 3x+y=1 and kx+2y=5 have

a) A unique solution.

b) No Solution.

5. The area of a triangle is 5sq. units. Two of its vertices are (2,1) and (3,-2). If the third vertex is (7/2,y) find the value of y.

6. Solve

a)1/(a+b+x)=(1/a)+(1/b)+(1/x).   b) 3(3x-1)/(2x+3)-2(2x+3)/(3x-1)=5.

7. Solve the equation $x^2-(\sqrt{3}+1)x+\sqrt{3}=0$ by the method of completing the square.

8. If P and Q are the points on the sides CA and CB of a right triangle ABC, at C. Prove that$(AQ)^2+(BP)^2=(AB)^2+(PQ)^2$.

9.Prove that cosecA /(cosec A-1)+ cosec A/(cosec A+1)=2$\sec^2$A.

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10. Construct a triangle ABC in which BC=6.5 cm. , AB=4.5 cm. and $\angle ABC = 60°$ and construct a triangle similar to this triangle whose sides are ¾ of the corresponding sides of triangle ABC.

11. From an external point P, a tangent PT and a line segment PAB is drawn to a circle with centre O. ON is perpendicular on the chord AB. Prove that

a) $PA.PB = PN^2 - AN^2$ b) $PN^2 - AN^2 = OP^2 - OT^2$ c) $PA.PB = PT^2$

12. A round balloon of radius r subtends an angle α at the eye of an observer while the angle of elevation of its centre is β. Prove that the height of the centre of the balloon is r sin β cosec α /2.

13. If the roots of the equation $(b-c)x^2 + (c-a)x + (a-b) = 0$ are equal, Prove that 2b=a+c.

14. Find the area of the trapezium ABCD in which AB is parallel to DC , AB=77 cm., BC=77 cm., CD=60 cm. and DA=26 cm.

15. Four equal circles each of radius 'a' units , touch each other. Show that the area between them is $6a^2/7$ sq. units.

16. In a circle of radius 7 cm. , a square ABCD is inscribed. Find the area of the circle which is outside the square.

17. A metallic cylinder has radius 3 cm. and height 5 cm. To reduce its weights, a conical hole is drilled in the cylinder. The conical hole has a radius 3/2 cm. and its depth is 8/9 cm. Calculate the ratio of the volume of the metals left in the cylinder to the volume of metal taken out in conical shape.

18. The height of a cone is 30 cm. A small cone is cut of at the top by a plane parallel to the base. If its volume be 1/27 of the volume of the given cone, at what height above the base is the section made?

19. The largest possible sphere is carved out from a solid wooden cube of side 7 cm. Find

a) The volume of the sphere.   b) The percentage of the wood wasted in the process.

20. Find the missing frequencies in the following frequency distribution table if N=100 and median is 32.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	Total
No. of Students	10	?	25	30	?	10	100

4 MARKS TYPE QUESTIONS

1. Places A and B are 100 km. apart on a highway. One car starts from A and another from B at the same time. If the car travels in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What is the speed of the two cars?

2. Solve (ax/b)-(by/a)=a+b

     ax-by=2ab.

3. Two water taps together can fill a tank in 75/8 hours . The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

4. Find the area of the triangle ABC with vertices A(0,-1), B(2,1) and C(0,3). Also find the area of the triangle formed by joining the mid points of its side. Show that the ratio of the areas of the two triangle is 4:1.

5. In an isosceles triangle ABC , AB=AC and D is a point on BC. Prove that $AB^2 - AD^2 = BD.CD$.

6. In an equilateral triangle ABC, D is a point on side BC such that BD=(1/3) BC. Prove that $9AD^2 = 7AB^2$

7. A triangle ABC is drawn to circumscribe a circle of radius 4 cm. such that the segment BD and DC into which BC is divided by the point of the contact D are of lengths 6 cm. and 8 cm. respectively. Find the lengths of the sides AB and AC.

8. Construct a pair of tangents to a circle of radius 3 cm.which are inclined to each other at an angle of 60°. Also write steps of construction.

9. Prove that $(secA+tanA-1)/(tanA-secA+1)=cosA/(1-sinA)$.

10. The angle of elevation of a cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake is β. Prove that the height of the cloud is h $(tanβ+tanα)/(tanβ-tanα)$ metres.

11. A man observes a car from the top of a tower which is moving towards the tower with a uniform speed. If the angle of depression of the car changes from 30° to 45° in 12 minutes, find the time taken by the car now to reach the tower.

12. In a rectangular park of dimension 50 m x 40 m , a rectangular pond is constructed so that the area of grass strip of uniform width surrounding the pound would be 1184 m^2 .Find the length and breadth of the pond.

13. Three horses are tethered with 7m long ropes at the three corners of a triangular field having sides 20m, 34m, and 42m. Find the area of the plot which can be grazed by the horses. Also find the area of the plot which remains ungrazed.

14. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface are of the solid so formed, at the rate of rupees 5 per 100sq. cm.

15. From each of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm. and its base is of radius 4.2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4 cm. thickens. Find the length of the wire.

16. The following table shows the frequency distribution of the scores obtained by 200 candidates in an entrance exam.

Score	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600
No. of candidates	30	15	45	20	25	40	10	15

Draw a cumulative frequency curve using less than series.

17. A metallic right circular cone is 20 cm. high and has a vertical angle of 60° .This is cut into two parts at the middle of its height by a plane parallel to the base. If the frustum so obtained is drawn into a wire of diameter 1/16cm, find the length of the wire.

18. A hemispherical depression is cut from a face of a cubical block of side 7 cm., such that the diameter of the hemisphere is equal to the edge of the cube. Find the surface area of the remaining solid.

19. Prove that the sum of the squares on the side of a rhombus is equal to the sum of the squares on its diagonals.

20. Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of an equilateral triangle described on one of its diagonals.