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NAME ...07/02/2020
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DELHI PUBLIC SCHOOL VINDHYANAGAR
PRE-BOARD 2 EXAMINATION (2019-20)

CLASS - X **Max. Marks: 80**
SUBJECT MATHEMATICS- STANDARD(041) **Time: 3 Hrs**

GENERAL INSTRUCTIONS :

1. All questions are compulsory.
2. The question paper consists of 40 questions, divided into four section A,B,C,D
3. Section A comprises of 20 questions of 1 mark each, Section B comprises of 6 questions of 2 marks each , section C comprises of 8 questions of 3 marks each and section D comprises of 6 questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each ,three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not allowed.

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Section A (1 mark each)

[Q1 - Q10 are multiple choice questions, Select the correct option.]

Q 1. In Euclid's division lemma : a= bq+r, if a<b ,then r is equal to
a) 0 b)a c) b d)q

Q 2. The ordinate of point of intersection of less than Ogive and more than Ogive of a grouped data gives its
a) mean b) median c) mode d) none of these

Q 3.For some integer q, every odd integer is of the form
a)2q-1 b)2q+1 c)both a and b d) none of these

Q 4. Area of triangle formed by lines x=0, y=0 , x+y=2 is .....
a)2 sq units b) 1 sq units c) 4 sq units d) None

Q 5. If ABC is isosceles right angled triangle right angled at C, then value of sin A + cos B =.....
a)2 b) $2^{1/2}$ c) 1 d) sin(A+B)

Q 6. sin (60°+A)—cos (30°—A) is equal to
(A) 2 cosA (B) 2 sinA (C) 0 (D) 1

Q 7. If $x=3\sec^2 A - 1$ and $y=\tan^2 A - 2$ then value of x-3y
a) 3 b) 4 c) 8 d)5

Q 8. . Coordinates of foot of perpendicular from point (-2,3) to y-axis is
a)(-2,0) b)(0,-3) c)(-2,-3) d) (0,3)

Q 9. In ΔABC whose vertices are A(1,2) ,B(3,4),C(0,-2) if D is mid point of BC then coordinates of point of trisection of AD closer to opposite side BC are
a) (1,2) b)(0,0) c) (2,2) d)$(\frac{4}{3},\frac{4}{3})$

Q 10. Distance between points A(x,3) and B(y,3) is
a) x-y b) y-x c) $|x-y|$ d)none

[Q11-Q15 are Fill in the blanks]

Q11.If perimeter of a circle is equal to that of a square, then the ratio of their areas is.....

Q12. If one root of the quadratic equation $kx^2+2020x+k=0$ is reciprocal of the other then k.....

Q13. If $\Delta ABC \sim \Delta DEF$ and ar(ΔABC) $= 36cm^2$ also AB=6 cm, DE= 4.5 cm find ar(ΔDEF)

OR

The perimeters of two similar triangles are 35cm and 45cm then ratio of their areas is.....

Q14. Sum of first n odd numbers is.....

OR

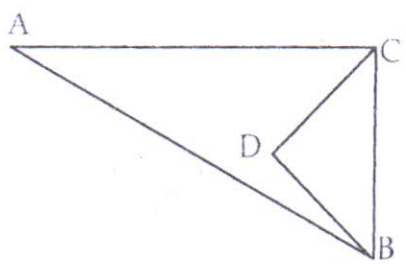
In an AP if a=1, a_n=20 and S_n= 399 then n=.....

Q 15. A number is chosen at random from the numbers -3.-2,-1,0,1,2,3,4,5. Then the probability that cube of this number is less than or equals to 1 is .....

[Q16-Q20, Answer the following]

Q16 . Give an example to show that product of two irrational numbers need not be irrational.

Q17. In the given figure $\angle ACB = 90°, \angle CDB = 90°, \angle A = \angle CBD$ and BC=2cm, DC=1cm find length of AB



Q18. PA and PB are tangents to a circle with centre O and radius 5cm ,if OP=13 cm find area of the quadrilateral PAOB.

Q19. Find common difference of the A P in which difference of 10^{th} and 30^{th} terms is 100.

Q 20. State whether roots of the equation $x^2+99x+129=0$, are both positive or both negative or one positive and other negative. Justify your answer.

[SECTION – B : 2marks each]

Q.21 Find the 10^{th} term from the end in the AP : 10,7,4,.....,- 62

Q22. Prove that the rectangle circumscribing a circle is a square.

Q23. Sides of a right triangle other than hypotenuse are of lengths 16cm and 8cm. Find the length of the side of the largest square that can be inscribed in the triangle.

OR

In ΔPQR, $PD \perp QR$ such that D lies on QR. If $PQ = a, PR = b, QD = c$ and $DR = d$ then prove that $(a+b)(a-b) = (c+d)(c-d)$.

Q24. An observer 1.5 meters tall is 20.5 meters away from a tower 22 meters high. Determine the angle of elevation of the top of the tower from the eye of the observer.

Q25. The probability of getting a rotten apple from a lot of 400 apples is .035. Find the number of rotten apples in the lot.

OR

Two dice are thrown once, find probability of getting a pair of co prime numbers whose sum is greater than 9.

Q26. A toy is in the form of a cone mounted on a hemisphere of diameter 7cm. The total height of the toy is 14.5 cm .Find the total volume of the toy. [Take $= \frac{22}{7}$]

Section C (3 marks each)

Q 27. If n is an odd integer, then show that n^2-1 is divisible by 8.

OR

Show that 12^n cannot end with the digit 0 or 5 for any natural number n.

Q28. In an AP ,if $S_n= 3n^2+5n$ and $a_k=164$, find the value of k.

Q29. For which values of a and b, will the following pair of linear equations have infinitely many solutions? $x+2y-1=0$

$(a-b)x + (a+b)y=a+b-2$

OR

Solve $43x+67y = -24$

$67x+43y = 24$

Q30. Find all zeros of the polynomial $2x^4-3x^3-3x^2+6x-2$ if two of its zeros are $\sqrt{2}$ and $-\sqrt{2}$.

Q31. If A(-2,-2) and B(2,-4) are two points, find coordinates of the point P which lies on line segment AB and $7AP=3AB$.

Q32. Prove that

$$\frac{\cos\theta-\sin\theta+1}{\cos\theta+\sin\theta-1} = \text{cosec}\,\theta + \cot\theta$$

OR

Evaluate $\cos^2(45^0+\theta)+\cos^2(45^0-\theta) + \tan(50^0+\theta)\tan(40^0-\theta) + \sec^2 63^0 - \tan 63^0 \cot 27^0$

Q33. Four circular cardboard pieces of radii 7cm each are placed on a plane in such a way that each piece touches the other two pieces. Find area of the portion enclosed between these pieces.

Q34 . Find median from the following frequency distribution

C.I	5-15	15-25	25-35	35-45	45-55	55-65	65-75
Frequency	2	3	5	7	4	2	2

Section D(4 marks each)

Q 35. Construct an acute angled triangle ABC with BC=5 cm, altitude AD from A to BC is of length 2.5 cm and AB=3 cm. Also construct a triangle similar to triangle ABC whose sides are 4/3 times the corresponding sides of the given triangle

OR

Construct a pair of tangents to a circle of radius 3.5 cm which are inclined to each other at an angle of 60^0.

Q 36. State and prove Pythagoras theorem.

Q 37. A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/hr more than its original speed. If it takes 3 hour to complete the total journey, what is its original average speed?

OR

Solve for x, $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}$, $x \neq 1,2,3$

Q 38. A building is in the form of a cylinder surmounted by a hemispherical dome. The base diameter of the dome is equal to 2/3 of the total height of the building. Find the height of the building, if it contains $67\frac{1}{21}$ m^3 of air.

OR

A hollow cone is cut by a plane parallel to the base and the upper portion is removed. If the curved surface of the remainder is 8/9 of the curved surface of the whole cone. Find the ratio of the line segments into which the cone's altitude is divided by the plane.

Q 39.The angle of elevation of an airplane from a point on the ground is 60^0. After a flight of 30 seconds, the angle of elevation becomes 30^0. If the airplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the airplane.

Q 40. The mean of the following frequency table is 50. But the frequencies f_1 and f_2 in class 20-40 and 60-80 are missing. Find the missing frequencies.

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	f_1	32	f_2	19	120