PREBOARD EXAMINATION

Class: X

SESSION: 2019-2020

Mathematics Standard (041)

Duration: 3 Hrs **Max. Marks: 80**

General Instructions:

i. All the questions are compulsory.
ii. The question paper consists of 40 questions divided into 4 sections A, B, C and D.
iii. 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. Section D comprises of 6 questions of 4 marks each.
iv. 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.
v. Use of calculators is not permitted.

SECTION- A

Q.1 – Q.10 are multiple choice questions. Select the most appropriate answer from the following given options.

1. The (HCF x LCM) for the numbers 125 and 80 is:

(a) 100 (b) 1000 (c) 10000 (d) 500

2. The mean of 20 numbers is 13.The new mean if each observation is increased by 5, is:

(a) 13 (b) 18 (c) 65 (d) 8

3. Which of the following is a non-terminating repeating decimal?

(a) $\frac{35}{14}$ (b) $\frac{14}{35}$ (c) $\frac{1}{7}$ (d) $\frac{7}{8}$

4. The pair of linear equations 3x + 4y + 5 = 0 and 12x + 16y + 15 = 0 have

(a) Unique solution (b) many solution (c) no solution (d) exactly two solution

5. If sinx+cosx = $\frac{1}{2}$ then $\sin^4 x+\cos^4 x$ as a rational number equals:

(a) $\frac{3}{4}$ (b) $\frac{15}{32}$ (c) $\frac{19}{32}$ (d) $\frac{23}{32}$

6. If tan $\theta = \frac{a}{b}$ then the value of $\frac{b\sin\theta - a\cos\theta}{b\sin\theta + a\cos\theta}$ is:

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

7. sin(A+B) = 1and cos (A-B)= $\frac{\sqrt{3}}{2}$,then the value of A and B are:

(a) 45^0,45^0 (b) 30^0,45^0 (c) 60^0,30^0 (d) 0^0,90^0

8. AOBC is a rectangle whose three vertices are A (0, 3), O (0, 0) and B (5, 0).The length of its diagonal is:

(a) 5 (b) 3 (c) 4 (d) $\sqrt{34}$

9. Find a point on the y-axis which is equidistant from the points A (6, 5) and B (-4, 3)

(a) (0,9) (b) (9,0) (c) (0,-9) (d) (0,3)

10. If the points A(1,2),O(0,0) and C(a , b) are collinear, then:

(a) a = b (b) a = 2b (c) 2a = b (d) a = -b

(Q.11 – Q.15) Fill in the blanks

11. Two figures having same shape and size are said to be_____

12. Points (1,5),(2,3) and(-2,-11) are ----------

OR

The value of expression $\sqrt{x^2+y^2}$ is the distance of the point P(x, y) from the ……..

13. The tangent to a circle is ..... to the radius through the point of contact.

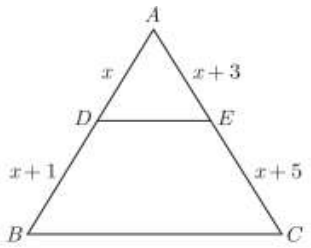
14. $\sin^2\theta + \sin^2(90-\theta) =$ .....

15. If the area of a circle is 154 cm^2, then its circumference is.....

(Q.16– Q.20) Answer the following (VSA)

16. Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere?

17. In ΔABC DE ‖ BC, find the value of x



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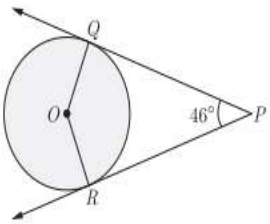
18. If PQ and PR are two tangents to a circle with center O. If ∠QPR = 46º then find ∠QOR.



OR

If two tangents inclined at an angle 60^0 are drawn to a circle of radius 3 cm, then find the length of each tangent.

19. Which term of an AP: 21, 42, 63, 84,…….is 210?

20. Which constant must be added and subtracted to solve the quadratic equation $9x^2 + \frac{3}{4}x - \sqrt{2} = 0$ by the method of completing the square?

SECTION- B

21. Show that $5+3\sqrt{2}$ is an irrational number.

22. Prove that the line segment joining the points of contact of two parallel tangents of a circle, passes through its centre.

23. In a rectangle ABCD, E is a point on AB such that AE = $\frac{2}{3}$AB.If AB = 6 km and AD 3 km,then find the DE

24.An observer 1.5 m tall is 28.5m away from a tower 30 m high.Find the angle of elevation of the top of the tower from his eyes.

25. The king, queen and jack of club are removed from a deck of 52 playing cards. The remaining cards are then well shuffled and one card is selected at random. Find the probability of getting

(i) a king (ii) the '10' of hearts.

OR

What is the probability of getting 53 Monday in a (i) Non leap year (ii) Leap year.

26. A cone of height 20 cm and radius of base 5 cm is made up of modeling clay. A child reshapes it in the form of a sphere. Find the diameter of a sphere.

SECTION- C

27. Show that the cube of any positive integer is of the form 9m, 9m+1 or 9m+8, for some integer m.

OR

Four bells toll at an interval of 8, 12, 15 and 18 secs respectively.al the four begins to toll together. How many times they toll together in one hour excluding the one at the start?

28. Find the sum of first n- terms of an A.P. whose n^{th} term is 5n-1. Hence find the sum of first 20 terms.

29. Solve graphically following equations:- x+2y-7=0 , 2x-y-11=0

OR

Solve for u and v: 2(3u-v) = 5uv; 2(u+3v) = 5uv

30. If 1 and -2 are zeros of $x^4-4x^3-x^2+16x-12$. Find the other zeros.

31. If the point A(2, -4) is equidistant from P(3, 8) and Q(-10, y), then find the value of y. Also, find distance PQ.

32. Prove that $\sqrt{sec^2\theta + cosec^2\theta} = \tan\theta + \cot\theta$

OR

Given that $\sin\theta + 2\cos\theta = 1$, then prove that $2\sin\theta - \cos\theta = 2$

33. The diameters of front and rear wheels of a tractor are 80cm and 2m respectively. find the number of revolutions that rear wheel will make in covering a distance in which the front wheel will makes 1400 revolutions.

34. Find the missing frequencies x and y in the following frequency distribution table, if N = 100 and median is 32.

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	Total
Number of students	10	x	25	30	y	10	100

SECTION- D

35. Draw ΔABC in which BC = 6cm, CA = 5cm and AB = 4cm. Construct a triangle similar to it and of scale factor of $\frac{5}{3}$

OR

Draw a 2 concentric circle of radii 3cm and 5cm. Taking a point on outer circle construct the pair of tangents to the other. Measure the length of tangent and verify it by actual calculation.

36. Prove that, " In a triangle, if a square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle".

37. Solve the quadratic equation $9x^2-9(a + b)\ x+2a^2+5ab+2b^2=0$

OR

At present Madhuri's age(in years) is 2 more than the square of her daughter Nayana's age.When Nayana grows to her mother's present age.Madhuri's age would be one year less than 10 times the present age of Nayana.Find the present ages of Both Madhuri and Nayana.

38. How many spherical led shots each of diameter 4.2 cm can be obtained from a solid rectangular lead piece with dimensions 66 cm,42 cm and 21 cm ?

OR

Water in canal 6m wide and 1.5 m deep is flowing with a speed of 10 km/hr.How much area will it irrigate in 30 minutes if 8 cm of standing water is desired?

39. From the top of a building,60 m high,the angles of depression of the top and bottom of a vertical lamp post are observed to be 30^0 and 60^0respectively.Find (i) the horizontal distance between the building and the lamp post.(ii) the height of the lamp post.(Take $\sqrt{3}$ =1.732)

40. The following distribution shows the distance thrown by 68 students in a Javelin throw competition.

Distance(in m)	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No.of students	4	5	13	20	14	8	4

Draw a less than type ogive for the given data and find the median distance thrown using this curve.

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