

MOCK TEST PAPER: 2019-20 SESSION

CLASS-X

MATHEMATICS

Max. Marks: 80**Duration: 3hrs****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 given options.

1. E
u

Euclid's division Lemma states that for two positive integers a and b , there exist unique integers q and r such that $a = bq + r$ satisfy

- (a) $1 < r < b$ (b) $0 < r < b$ (c) $0 \leq r < b$ (d) $0 > r > b$

2. A student draws a cumulative frequency curve for the marks obtained by 40 students of a class. The median marks obtained by the students of the class are:

- (a) 55 (b) 65 (c) 50 (d) 60

3. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then LCM (p, q) is:

- (a) ab (b) a^2b^2 (c) a^3b^2 (d) a^3b

4. For what value of k will the following pair of linear equations have infinitely many solutions $kx + 3y - (k-3) = 0$ $12x + ky - k = 0$

- (a) 4 (b) 5 (c) 6 (d) 0

5. If $4 \tan \theta = 3$, then $\left\{ \frac{4 \sin \theta - \cos \theta}{4 \sin \theta + \cos \theta} \right\}$ is equal to

- (a) $\frac{2}{3}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

6. If $\sin(A-B) = \frac{1}{2}$; $\cos(A+B) = \frac{1}{2}$, then $\sin(A+B) =$

- (a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1

7. $(1 + \tan^2 \theta + \sec^2 \theta)(1 + \cot^2 \theta \text{ cosec}^2 \theta) =$

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

8. The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is:

- (a) 5 (b) 12 (c) 11 (d) $7 + \sqrt{5}$

9. If P $\left(\frac{a}{3}, 4\right)$ is the mid-point of the line segment, joining the points Q(-6, 5) and

R(-2, 3), then the value of a is:

- (a) -4 (b) -12 (c) 12 (d) -6

10. If A(1, 3), B(-1, 2), C(2, 5) and D(x, y) are the vertices of a parallelogram ABCD, then the value of x is:

- (a) 3 (b) 4 (c) 0 (d) $\frac{3}{2}$

(Q 11- Q 15) Fill in the Blanks

11. Metallic spheres of radii 6 cm, 8 cm and 10 cm respectively are melted to form a single solid sphere. The radius of the resulting sphere is _____

12. The sum of two natural numbers is 8. Also, sum of their reciprocals is $\frac{8}{15}$.

The numbers are: _____

Or

The roots of the equation $100x^2 - 20x + 1 = 0$ are _____

13. In the figure, $DE \parallel BC$. If $BC = 8$ cm, $DE = 6$ cm and area of $\triangle ADE = 45 \text{ cm}^2$, then area of $\triangle ABC =$ _____

14. The value of n , for which n th terms of two APs 63, 65, 67, and 3, 10, 17, ... are equal is _____

15. Probability of getting a number less than 50 on a die is _____

(Q 16- Q 20) Answer the Following

16. What can you say about the prime factorisation of denominator of the rational number $10.\dot{3}$?

17. If the areas of two similar triangles are equal, then the triangles are congruent. Prove

18. In a circle of radius 7 cm, tangent PT is drawn from a point P such that $PT = 24$ cm. If O is the centre of circle, then find the length of OP.

Or

Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

19. If 6th term of an AP is -10 and its 10th term is -26, then find the 15th term of the AP.
20. For what values of k , the roots of the equation $x^2 + 4x + k = 0$ are real?

SECTION-B

21. Find the sum:

$$7 + 10\frac{1}{2} + 4 + \dots + 84$$

22. Prove that the line segment joining the midpoints of the sides of a triangle form four triangles, each of which is similar to the original triangle.
23. Ankit whose height is 160 cm, is going away from a lamp post at a speed of 2m/sec. If the lamp post is 3.2 m above the ground, find the length of his shadow after 5 seconds.

24. Prove the following identity:

$$\frac{1}{\sec\theta - \tan\theta} - \frac{1}{\cos\theta} = \frac{1}{\cos\theta} - \frac{1}{\sec\theta + \tan\theta}$$

25. Two different dice are rolled together. Find the probability that:

- (i) The number on each dice is even.
- (ii) The sum of numbers appearing on two dice is 5.

Or

In a single throw of a pair of different dice, what is the probability of getting

- (i) A prime number on each dice?
- (ii) A total of 9 or 11?

26. The slant height of a 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.

SECTION-C

27. Prove that $\sqrt{2} + \sqrt{3}$ is irrational.

Or

For any positive integer n , prove that $n^3 - n$ is divisible by 6.

28. If the sum of first m terms of an AP is n and the sum of first n terms is m , then show that the sum of its first $(m+n)$ th term is $-(m+n)$.
29. 2 women and 5 men together finish an embroidery work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work, and also that taken by 1 man alone.

Or

Solve: $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2; \frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$

30. If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - 2x + 3$, then form a quadratic polynomial whose zeroes are $\alpha + 2$ and $\beta + 2$.

31. If (x, y) is a point on the line, joining $(a, 0)$ and $(0, b)$, then show that $\frac{x}{a} + \frac{y}{b} = 1$.

32. If $\operatorname{cosec} \theta = x + \frac{1}{4x}$, Prove that $\operatorname{cosec} \theta + \cot \theta = 2x \vee \frac{1}{2x}$.

Or

If $5 \sin \theta + 7 \cos \theta = 7$, show that $7 \sin \theta - 5 \cos \theta = \pm 5$.

33. The diameter of a cycle wheel is 21 cm. how many revolutions will it make in moving 1.32 km?

34. A survey regarding the heights (in cm) of 50 girls of class X of a school was conducted and the following data was obtained. Find mode of the following data.

Height(cm)	120-130	130-140	140-150	150-160	160-170	Total
Frequency	2	8	12	20	8	50

SECTION-D

35. Draw a circle of radius 5 cm. Draw a pair of tangents to this circle, which are inclined to each other at an angle of 60° .

36. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.

37. Two water taps together can fill a tank in $1\frac{7}{8}$ hours. The tap with longer diameter takes 2 hours less than the tap with smaller one to fill in tank separately. Find the time in which each tap can fill the tank separately.

Or

Find the real roots of the following equation, if possible by quadratic formula.

$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}; x \neq -1, -2, -4$$

38. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}$ of the volume of the given cone, at which height above the base is the section made?

Or

A hemispherical tank of radius $\frac{1}{3}$ m is full of water. It is connected with a pipe which empties at the rate of 7 litres per second. How much time, in minute, will it take to empty the tank completely?

- 39.** The angle of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.
- 40.** 100 surnames were randomly picked up from a local telephone directory and the frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows:

Numbers of letters	1-4	4-7	7-10	10-13	13-16	16-19
Numbers of surnames	6	30	40	16	4	4

Determine the median number of letters in the surnames. Find the mean number of letters in the surnames? Also, find the modal size of the surnames.