

10th Maths Sample Paper-3 (CBSE Board Exam 2018)

Time Allowed: 3 Hours

Max. Marks: 80

Section A

Questions from 1 to 6 carry 1 mark each.

1. What is the HCF of 65 and 117?
2. Find the distance of point (1, 2) from the mid-point of the line segment joining the points (6, 8) and (2, 4).
3. Find the length of the tangent drawn from a point 10 cm away from the centre of a circle of radius 6 cm.
4. If $A + B = 90^\circ$, show that $1 + \cot^2 A = \sec^2 B$.
5. If $\tan(A - B) = \frac{1}{\sqrt{3}}$ and $\sin A = \frac{1}{\sqrt{2}}$, find the value of B.
6. What is the probability that a number selected at random from the numbers: 3, 4, 5, 39 is a multiple of 5?

Section B

Questions from 7 to 12 carry 2 marks each.

7. Show that every even integer is of the form $2q$, and every odd integer is of the form $2q + 1$, where q is some integer.
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. Find the roots of $6x^2 - \sqrt{2}x - 2 = 0$, using the quadratic formula.
10. The first and the last terms of an A.P. are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum?
11. The vertices of a triangle are $A(1, -3)$, $B(-1, 1)$ and $C(7, 1)$. Find the length of median through the vertex A.
12. In $\triangle ABC$, BD and CE are altitudes. Prove that $\triangle ADB \sim \triangle AEC$.

Section C

Questions from 13 to 22 carry 3 marks each.

13. Prove that $2 - 3\sqrt{2}$ is an irrational number.
14. What must be subtracted from $6x^3 + 11x^2 - 39x - 65$ so that the resulting polynomial is exactly divisible by $x^2 + x - 1$?
15. The ratio of the 11th term to the 18th term of an A.P. is 2 : 3. Find the ratio of the 5th term to the 21st term; and also the ratio of the sum of the first five terms to the sum of the first 21 terms.
16. If $A(4, 5)$, $B(p, 6)$, $C(6, q)$ and $D(3, 2)$ are the vertices of a parallelogram, then find the values of p and q .
17. Prove that $\frac{\sec \theta - \tan \theta}{\sec \theta + \tan \theta} = 1 - 2 \tan \theta (\sec \theta - \tan \theta)$.
18. Prove that $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = \operatorname{cosec} \theta \sec \theta + 1$.
19. All the vertices of a rhombus lie on a circle. Find the area of the rhombus, if area of the circle is $1,256 \text{ cm}^2$.
[Use $\pi = 3.14$]
20. Find the number of coins, 1.5 cm in diameter and 0.2 cm thick, to be melted to form a right circular cylinder of height 8 cm and base radius 3 cm.

21. For the following distribution, find the mean by step deviation method:

<i>Class Interval</i>	0–20	20–40	40–60	60–80	80–100	100–120
<i>Frequency</i>	9	16	24	15	4	2

22. Two dice are numbered 1, 2, 3, 4, 5, 6 and 1, 1, 2, 2, 3, 3 respectively. They are thrown once and the sum of numbers on them is noted. Find the probability of getting each sum from 3 to 7 separately.

Section D

Questions from 23 to 30 carry 4 marks each.

23. Find graphically the vertices of a parallelogram bounded by the lines whose equations are:

$$y = x - 2; x = y - 1; x = 2 \text{ and } x = 4.$$

24. Two water taps A and B together can fill a tank in 12 hours. Tap A takes 10 hours less than the time taken by tap B to fill the tank separately. Find the time taken by tap B to fill the tank.

25. Prove that *the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.*

Using the above, find AC if areas of two similar triangles ABC and PQR are 49 cm^2 and 64 cm^2 respectively and $PR = 5.6 \text{ cm}$.

26. Prove that *the lengths of tangents drawn from an external point to a circle are equal.* Use this result to solve the following:

A quadrilateral PQRS is drawn so as to circumscribe a circle.

Prove that $PS + QR = PQ + RS$.

27. Construct a triangle PQR in which $QR = 6 \text{ cm}$, $\angle Q = 60^\circ$ and $\angle R = 45^\circ$ Construct another triangle similar to ΔPQR such that its sides are $\frac{5}{6}$ th of the corresponding sides of the ΔPQR .

28. The angle of elevation of the top of a vertical tower from a point on the ground is 60° . From another point 10 m vertically above the first, its angle of elevation is 45° . Find the height of the tower.

29. A conical vessel of radius 6 cm and height 8 cm is completely filled with water. A sphere is lowered into the water and its size is such that when it touches the sides it is just immersed. What fraction of water overflows?

30. Draw *more than* ogive for the following frequency distribution. Use the ogive and estimate:

(i) Median

(ii) The number of students who obtained more than 75% marks.

<i>Marks</i>	<i>Number of Students</i>
0–10	5
10–20	9
20–30	16
30–40	22
40–50	26
50–60	18
60–70	11
70–80	6
80–90	4
90–100	3

What value do you attach to the performance of students as a whole?