10th Maths Sample Paper-1 (CBSE Board Exam 2018)

Time ...

Section A

Max. Marks: 80

Questions from 1 to 6 carry 1 mark each.

1. Which of the following is not an irrational number?

$$\sqrt{7},\ \frac{1}{\sqrt{3}},\ 7-\sqrt{9},\ \sqrt{7}+\sqrt{9}$$

2. Find roots of the quadratic equation $x(2x + 5) = 25$.

3. Find whether the following pair of linear equations has a unique solution, no solution or infinitely many solutions:

$$2x - 3y = 2$$
$$x + 2y = 8$$

4. If the points $(-5, 1)$, $(1, p)$ and $(4, -2)$ are collinear, then find the value of p.

5. If a point P is 13 cm away from the centre of a circle and the length of the tangent drawn from P to the circle is 12 cm, what is the radius of the circle?

6. If $\tan\theta = \frac{a-b}{a+b}$, then find $\sin\theta$ in terms of 'a' and 'b'.

Section B

Questions from 7 to 12 carry 2 marks each.

7. Prove that every positive even integer is of the form $2m$ and that every positive odd integer is of the form $2m + 1$, where m is an integer.

8. If 1 and 3 are two zeros of the polynomial $x^3 - ax^2 - 13x + b = 0$, then find the values of 'a' and 'b'.

9. Find the zeros of the quadratic polynomial $x^2 + x - 12$.

10. Show that the points $(-4, 0)$, $(4, 0)$ and $(0, 3)$ are vertices of an isosceles triangle.

11. Find the value of $2\sqrt{2}\cos 45^\circ \cos 60^\circ + 2\sqrt{3}\sin 30^\circ \tan 60^\circ$.

12. Prove: $\cos^4 A - \cos^2 A = \sin^4 A - \sin^2 A$

Section C

Questions from 13 to 22 carry 3 marks each.

13. Show that the cube of any positive integer is of the form $9k$, $9k + 1$ or $9k + 8$, where k is some integer.

14. Solve for x:

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

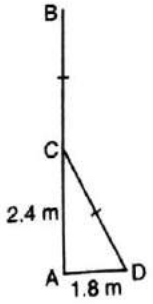
15. Find the value of p, if the numbers x, $2x + p$, $3x + 6$ are three consecutive terms of an A.P.

16. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are $(0, -1)$, $(2, 1)$ and $(0, 3)$.

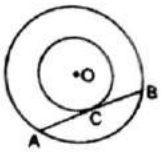
17. Prove that *in a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.*

Using the above theorem, answer the following:

A vertical pillar AB is bent at C at a height 2.4 m and its upper end B touches the ground at D at a distance of 1.8 m from the end A on the ground. Find the height of the pillar AB.

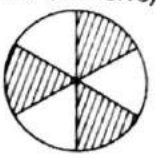


18. In the given figure, O is the centre of two concentric circles. AB is a chord of the larger circle touching the smaller circle at C. Prove that AC = BC.



19. From the top of a tower 50 m high, the angles of depression of the top and bottom of a pole are observed to be 45° and 60° respectively. Find the height of the pole. (Take $\sqrt{3} = 1.73$)

20. In the given figure, there are three blades of same size of a fan of radius 60 cm, find the area of each blade. (Take $\pi = 3.14$)



21. The radius of a sphere is 9 cm. It is melted and drawn into a wire of diameter 2 mm. Find the length of the wire.

22. A bag contains 6 red balls and some black balls. If the probability of drawing a black ball from the bag is twice that of a red ball, then find the number of black balls in the bag.

Section D

Questions from 23 to 30 carry 4 marks each.

23. For what values of p and q does the following pair of linear equations have infinite number of solutions:

$$2x + 3y = 7$$
$$(p - q)x + (p + q)y = 3p + q - 2.$$

24. Solve the equation for x:

$$1 + 4 + 7 + 10 + \ldots + x = 287$$

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

26. Draw a circle of diameter 6 cm. From a point 7 cm away from the centre of the circle, draw two tangents to the circle. Prove that the two tangents drawn will be of same length.

27. From the top of a tower 'h' m high, the angles of depression of two objects, which are in line with foot of the tower are α and β ($\alpha < \beta$). Find the distance between the two objects.

28. A solid, consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm, is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the water left in the cylinder, if the radius of the cylinder is 60 cm and the height 180 cm.

29. Draw the *less than* ogive and *more than* ogive for the following distribution and find the median graphically:

Daily Wages (₹)	150–155	155–160	160–165	165–170	170–175	175–180
Number of Workers	6	10	22	34	16	12

30. A lot consists of 48 mobile phones of which 42 are good. 3 have only minor defects and 3 have major defects. Varnika will buy a phone if it is good, but the trader will only buy a mobile if it has no major defect. One phone is selected at random from the lot. Find the probability that it is (*i*) acceptable to Varnika (*ii*) acceptable to the trader. What do you expect the trader to do with the mobile phones having minor defects?