

10th Maths Sample Paper-7 (CBSE SA2 Board Exam 2018)

Time Allowed: 3 Hours

Max. Marks: 80

Section-A

1. Is $\sqrt{\frac{9}{\pi}}$ a rational or irrational.
2. If $x = 3 \sin\theta$ and $y = 4 \cos\theta$. Find value of $\sqrt{16x^2 + 9y^2}$
3. ABCD is a rectangle whose three vertices are B (4, 0), C (4,3) and D (0, 3). What is the length of one of its diagonals?
4. What constant number must be added or subtracted to $4x^2+12x+8=0$ to solve it by method of completing the square?
5. If $x = -\frac{1}{2}$ is a solution of the quadratic equation $3x^2 + 2kx - 3 = 0$, find the value of k.
6. In $\triangle ABC$, the points D and E are on the sides CA, CB respectively such that $DE \parallel AB$, $AD = 2$, $DC = x + 3$,
 $BE = 2x - 1$ and $CE = x$. Find x

Section-B

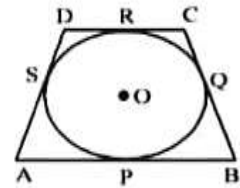
7. Find the HCF of 1, 6520, 1725 and 255 by Euclid's division algorithm.
8. If the point (-1, 2) is equidistant from the points A (3, k) and B(k, 5), find the values of k.
9. The probability of selecting a rotten apple randomly from a heap of 900 apples is 0.18. What is the number of rotten apples in the heap?
10. The probability of selecting a red ball at random from a jar that contains only red, blue and orange balls, The probability of selecting a blue ball at random from the same jar is $\frac{1}{4}$. If the jar contains 10 orange balls, find the total number of balls in the jar.
11. Sum of the ages of a father and the son is 40 years. If father's age is three times that of his son, then find their respective ages.
12. The ratio of the sum of first n terms of two A.P.'s is $(7n + 1) : (4n + 27)$, find the ratio of their m^{th} terms.
Or, If x, y, z are in A.P., then find the value of $(x + y - z) (-x + y + z)$.
13. Show that $\frac{2}{3\sqrt{5}}$ is irrational.

Section-C

14. Obtain all other zeroes of the polynomial $4x^4 + x^3 - 72x^2 - 18x$. If two of its zeroes are $3\sqrt{2}$ and $-3\sqrt{2}$
15. If the x- coordinate of a point P is twice its y-coordinate. If P is equidistant Q (2, -5) and R (-3, 6), find the coordinates of P

OR The area of a triangle is 5sq units. Two of its vertices are (2, 1) and (3,-2) . If the third vertex is $(\frac{7}{2}, y)$, find the value of y.

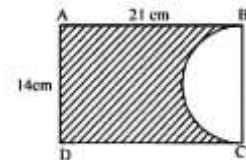
16. In a quadrilateral ABCD is drawn to circumscribe a circle with centre O, in such a way that the sides AB, BC, CD and DA touch the circle at the points P, Q, R and S respectively. Prove that $AB + CD = BC + AD$.



17. If $\frac{\cos\alpha}{\cos\beta} = m$ and $\frac{\cos\alpha}{\sin\beta} = n$, show that $(m^2 + n^2)\cos^2\beta = n^2$

OR, Find the value of 'x' such that $2\operatorname{cosec}^2\theta = 30^\circ + x \sin^2 60^\circ - \tan^2 30^\circ = 10$

18. In the given figure, ABCD is a rectangle dimensions 21 cm x 14 cm. A semicircle is drawn with BC as diameter. Find the area and the perimeter of the shaded region in the figure.



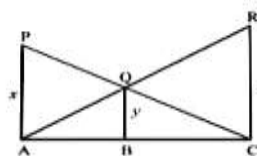
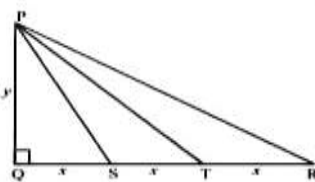
19. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of Rs.5 per 100 sq. cm [Use $\pi = 3.14$].

OR, 504 cones, each of diameter 3.5 cm and height 3 cm, are melted and recast into a metallic sphere. Find the diameter of the sphere and hence find its surface area.

20. Find the sum of values of a and b for which the following system of equations has infinite number of solutions: $2x + 3y = 7$ and $(a + b + 1) + (a + 2b + 2)y = 4(a + b) + 1$

21. In the given figure, S and T trisect the side QR of a right triangle PQR. Prove that $8PT^2 = 3PR^2 + 5PS^2$

OR, In the given figure PA, QB and RC, each are perpendicular to AC. Prove that $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$



22. The mean and median of 100 observations are 50 and 52 respectively. The value of the largest observation is 100. It was later found that it is 110 not 100. Find the true mean and median.

Section-D

23. If $\cos\theta + \sqrt{3}\sin\theta = 2\sin\theta$, Show that $\sin\theta - \sqrt{3}\cos\theta = 2\cos\theta$.

24. A well of diameter 4m is dug 21 m deep. The earth taken out has been spread evenly all around it in the shape of a circular ring of width 3 m to form an embankment. Find the height of the embankment.

25. Solve the following for x : $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$ OR Solve for x: $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$, $x \neq -1, -2, -4$

26. Prove that the ratio of the areas of two similar triangles is equal to the ratio or the square of their corresponding sides.

OR, In a right triangle. Prove that the square of the hypotenuse is equal to the sum of the squares of the other two sides.

27. The angles of depression of the top and bottom of a 50 m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building.

OR, A vertical tower stands on a horizontal plane and is surmounted by a vertical flag staff of height h. At a point on the plane the angles of elevation the bottom and the top of the Flag staff are α and β respectively.

Prove that the height of the tower is $\left(\frac{h \tan\alpha}{\tan\beta - \tan\alpha}\right)$

28. if $\frac{b+c-a}{a}$, $\frac{c+a-b}{b}$ and $\frac{a+b-c}{c}$ are in A.P. then prove $\frac{1}{a}$, $\frac{1}{b}$, $\frac{1}{c}$ are in A.P.

29. Drawn triangle ABC with side BC = 7 cm. $\angle B = 45^\circ$. $\angle A = 105^\circ$. Construct a triangle whose sides are $(4/3)$ times the corresponding side of ΔABC .

30. A cone is cut by a plane parallel to its base and upper part is removed. If the curved surface area of the remainder is $15/16$ of the curved surface area of the whole cone, find the ratio of the line-segments into which the cone's height is divided by the plane.