

10th Maths Sample Paper-2 (CBSE Board Exam 2018)

Time Allowed: 3 Hours

Max. Marks: 80

Section A Questions from 1 to 6 carry 1 mark each.

1. Given positive integers a and b , there exist unique integers q and r satisfying $a = bq + r$. Write the range of r .
2. If the centroid of a triangle formed by points (a, b) , (b, c) and (c, a) is $(0, 0)$, then find $a^3 + b^3 + c^3$.
3. AB and CD are two common tangents to circles which touch each other at C . If D lies on AB such that $CD = 4$ cm, then what is the length of AB ?
4. If $\sin \theta + \sin^2 \theta = 1$, prove that $\cos^2 \theta + \cos^4 \theta = 1$.
5. If $\cos A = 3/5$, find $9\cot^2 A - 1$.
6. A dice is tossed once. What is the probability of getting a number greater than 5?

Section B Questions from 7 to 12 carry 2 marks each.

7. If $\text{HCF}(a, b) = 12$ and $a \times b = 1800$, find the $\text{LCM}(a, b)$.
8. Find the zeros of $4x^2 - 7$ and verify the relationship between the zeros and its coefficients.
9. Find the roots of the following quadratic equation: $3x - \frac{8}{x} = 2$
10. The 5th and 15th terms of an A.P. are 13 and -17 respectively. Find the sum of first 21 terms of the A.P.
11. The centre of a circle is $(2a + 3, 2a - 1)$. Find the value of a if the circle passes through the point $(11, 9)$ and has diameter of length 20 units.
12. In $\triangle ABC$, $AD \perp BC$. If $BD = 8$ cm, $DC = 2$ cm and $AD = 4$ cm, then show that $\triangle ABC$ is right-angled at A .

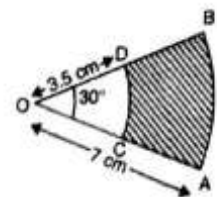
Section C Questions from 13 to 22 carry 3 marks each.

13. In a single throw of two dice, what is the probability of getting:
 - (i) a total of 9 or 11, (ii) the product of two numbers as 6 (iii) the sum of the two numbers as even?
14. Find the median of the following frequency distributions

Class interval	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Frequency	12	16	8	10	8	2	4

15. The radii of circular ends of a solid frustum of a cone are 33 cm and 27 cm and its slant height is 10 cm. Find its total surface area. (Take $\pi = 3.14$)

18. In the given figure, there are sectors of two concentric circles of radii 7 cm and 3.5 cm. Find the area of shaded region.



17. Simplify: $(\sec^2 \theta + \tan^2 \theta)^2 - 4 \sec^2 \theta \tan^2 \theta$
18. If $\sec \theta + \tan \theta = 4$, then find the values of $\cos \theta$, $\tan \theta$ and $\sin \theta$.
19. The line segment joining the points $A(3, 2)$ and $B(5, 1)$ is divided at the point P in ratio $1 : 2$ and it lies on the line $3x - 18y + k = 0$. Find the value of k .
20. The 24th term of an A.P. is twice its 10th term. Show that its 72nd term is 4 times its 15th term.
21. Using Euclid's Division Lemma show that the square of any odd integer is always of the form $4m + 1$, for some integer m .

22. Verify that -2, 1 and -2 are the zeros of the polynomial $2x^3 + x^2 - 5x + 2$. Also, verify the relationship between the zeros and the coefficients.

Section D Questions from 23 to 30 carry 4 marks each.

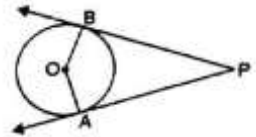
23. Solve for x and y: $\frac{x}{6} + \frac{y}{4} = 1$; $\frac{3x}{4} - \frac{x-3}{2} = 7/4$

24. A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, what is its original average speed?

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

Use it to prove the following: The sum of the squares of the diagonals of a rhombus is equal to four times the square of its any side.

26. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. Using this result prove the following: In the figure given below, OA and OB are two radii of the circle. If PA and PB are tangents to the circle at A and B respectively, prove that $\angle AOB$ and $\angle APB$ are supplementary.

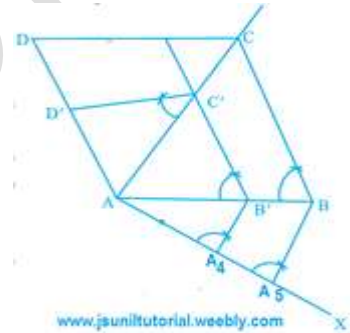


27. Draw a triangle with sides 4 cm, 6 cm and 7 cm. Then construct a triangle similar to it whose sides are $\frac{2}{3}$ rd of the corresponding sides of the given triangle.

OR,

Draw a quadrilateral ABCD with AB = 3 cm, AD = 2.7 cm, DB = 3.6 cm, $\angle B = 110^\circ$ and BC = 4.2 cm. Construct a quadrilateral A'B'C'D' with each side equal to $\frac{4}{5}$ th of the corresponding side of quadrilateral ABCD

Hint: Solution: First draw a quadrilateral ABCD in which and join AC. Construct the triangle AB'C' similar to $\triangle ABC$ with scale factor $\frac{4}{5}$. Finally draw the line segment C'D' parallel to CD.



28. From a window 60 metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are 60° and 45° respectively. Show that the height of the opposite house is $60(1+\sqrt{3})$ metres.

29. From a solid cylinder of height 8 cm and base radius 6 cm, a conical cavity of height 8 cm and base radius 6 cm is hollowed out. Find the total volume of the remaining solid correct to two places of decimal. Also, find the total surface area of the remaining solid. (Take $\pi = 3.1416$)

30. Find the 'mean' and 'mode' for the following data:

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
Number of Patients	6	11	21	23	14	5

In this distribution, people of which age group attach less value to being healthy?