

MATHEMATICS

CLASS X

Time-: 3 Hours

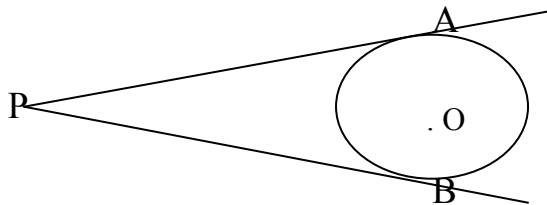
Max. Marks-: 100

Section A

1. If PAB is secant to a circle intersecting the circle at A and B and PT is a tangent, Prove that $PA \times PB = PT^2$.
2. Find the sum of the series-: $5 + 13 + 31 + \dots + 181$.
3. Sonu can purchase a motorcycle for Rs. 39,300. Cash or for Rs. 12,820. Cash down payment and three equal half yearly installment. If the dealer charges interest at the rate of 20% per annum compounded annually, calculate each installment.
4. A wristwatch is available for Rs. 960 cash or for Rs. 480 cash down payment and two equal monthly installments of Rs. 245 each. Calculate the rate of interest charged under the installment plan.
5. If $(x - 3)$ is a factor of $x^2 - 5x + q$ and $3p + 2q = -3$, find the value of p and q.
6. Simplify-:

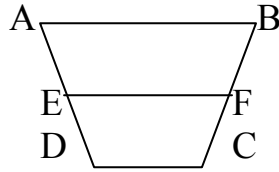
$$\frac{(x + 1)}{(x - 1)} - \frac{(x - 1)}{(x + 1)} - \frac{4x}{(x^2 + 1)}.$$

7. In given circle calculate the measure $\angle AOC$
8. Using quadratic formula, solve the following equation for x:
 $Pqx^2 + (q^2 - pr)x - qr = 0$
9. In the fig. PA and PB is tangent from P to the circle with center O. M is a Point on the circle. Prove that $PL + LM = PN + NM$.



10. In the fig. If $EF \parallel DC \parallel AB$,

Prove that $AE/ED = BF/FC$.



SECTION- B

11. Determine graphically the coordinates of the triangle, the equation of whose sides are $y = x$; $3y = x$; and $x + y = 8$.
12. If the distance of P (x, y) from A (6,3) and B (-3,6) are equal prove that $3x = y$.

OR

The coordinates of the centroid of a triangle are (1, 3) and two of its vertices are (-7, 6) and (8, 5). Find the third vertex of the triangle.

13. If h, c, v are respectively the height the curved surface and volume of a cone
Prove that $3\pi v h^3 - c^2 h^2 + 9v^2 = 0$
14. 20 Cards are numbered 1 to 20. One card is then drawn at random what is the Probability that the number on the card will be
(i) A Multiple of 4? (ii) Not a multiple of 6?
15. If P and Q are two points whose coordinates are $(at^2, 2at)$ and $(a/t^2, -2a/t)$ respectively, and S is the points (a, 0). Show that $1/SP + 1/SQ$ is independent of t.
16. Construct a triangle ABC with $BC = 9$ cm, $\angle A = 60^\circ$ and median AD through A is 5 cm long. Construct a triangle A'BC' similar to ΔABC , with $BC' = 8$ cm.
17. If P^{th} , q^{th} and r^{th} terms of an A.P. are x, y, z respectively then prove that $x(q-r) + y(r-p) + z(p-q) = 0$
18. Find the missing frequency in the following frequency distribution if it is known that mean of the distribution is 1.46

No. of accidents	0	1	2	3	4	5	Total
Frequency	46	F1	F2	25	10	5	200

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Find the value of F1 and F2.

19. The monthly expense of a family are shown in following draw pie chart

Items	Food	Clothing	Fuel & Light	House Rent	Education
Expenses (in Rs)	400	560	600	640	680

20. Prove that:

$$\sin^6 A + \sin^4 A \cos^2 A - \sin^2 A \cos^4 A - \cos^6 A = 1 - 2 \cos^2 A$$

OR

$$2(\tan 53^\circ / \cot 37^\circ) - (\cot 80^\circ / \tan 10^\circ) + 1 / \{1 + \cos (90^\circ - \theta)\} + \{1 / 1 - \cos (90^\circ - \theta)\}$$

SECTION – C

21. A cylinder container is filled with ice cream, whose radius is 6 cm and height is 15 cm. The whole ice cream is distributed to 10 children in equal cones having hemispherical tops. If the height of the conical portion is four times the radius of its base, find the radius of the base of the ice-cream cone.

OR

The diameters of the internal and external surface of a hollow hemispherical shell are 6 cm and 10 cm respectively? If it melted and recast into a solid cylinder of diameter 14 cm, find the height of the cylinder.

22. A man on a cliff observe a boat at an angle of depression of 30° which is approaching the shore to the point immediately beneath the observe with a uniform speed. Six minutes later the angle of depression of the boat is found to be 60° . Find the time taken by the boat to reach the shore.

OR

A vertical tower stands on a horizontal plane and is surmounted by a vertical Flagstaff of height h . At a point on the plane, the angle of elevation of the bottom of the flagstaff is α and that of the top of flagstaff is β . Prove that the height of the tower is $h \tan\alpha / (\tan\beta - \tan\alpha)$

23. If a chord is drawn through the point of contact of a tangent to a circle, then the angles that this chord makes with the given tangents are equal respectively to the angles formed in the corresponding alternate segment. Prove.

Using above theorem- in the given figure $\angle ACB = 48^\circ$, find $\angle ATB$ and $\angle ADB$.

24. A cyclist cycles non-stop from A to B, a distance of 14 km at a certain average speed. If his average speed reduces by 1 km/h, he takes 20 minutes more to cover the same distance. Find his original average speeds.

25. Annual income from salary of Usha is Rs. 2,40,000. She contributes Rs, 2000 per month to provident fund pays annual LIC premium Rs, 5,000. Invests Rs, 15,000 in NSC's and donates Rs, 5,000 to PM's National Relief Fund carrying 100% relief. Calculate the income tax if a sum of Rs, 2,250 was deducted at sources as income tax from each salary for eleven months. Find the income tax payable in the last month

RATES OF INCOME TAX APPLICABLE FOR 2005-06

1. SAVING Upto 1,00,000 totally exempted, applicable for all

Taxable Income Annual Income – Donation (if any) – Saving
(saving maximum Rs. 1,00,000)

2. Rates of Income Tax for Males (Below 65 Years)

Slab	Rate
(i) Upto Rs. 1,00,000/-	No income Tax
(ii) From Rs. 1,00,001 to Rs 1,50,000	10% of income above Rs. 1,00,000/-
(iii) From Rs. 1,50,001 to Rs. 2,50,000	Rs. 5000/- + 20% of income above Rs. 1,50,000/-
(iv) From Rs. 2,50,001 onwards	Rs. 25,000/- + 30% of income above Rs. 2,50,000/-
Surcharge above	10% of income Tax if total income is Rs. 10,00,000/-

Educational Cess **2% of the income tax**

3. Rates of Income Tax for Female (Below 65 Years)

Slab	Rate
(i) Upto Rs. 1,35,000/-	No income Tax
(ii) From Rs. 1,35,001 to Rs 1,50,000	10% of income above Rs. 1,35,000/-
(iii) From Rs. 1,50,001 to Rs. 2,50,000	Rs. 1500/- + 20% of income above Rs. 1,50,000/-
(iv) From Rs. 2,50,001 onwards	Rs. 21,500/- + 30% of income above Rs. 2,50,000/-

Surcharge **10% of income Tax if total income is above**
Rs. 10,00,000/-

Educational Cess **2% of the income tax**

4. Rates of Income Tax for all above 65 Years.

Slab	Rate
(i) Upto Rs. 1,85,000/-	No income Tax
(ii) From Rs. 1,85,001 to Rs 2,50,000	20% of income above Rs. 1,00,000/-
(iii) From Rs. 2,50,001 onwards	Rs. 13,000/- + 30% of income above Rs. 2,50,000/-

Surcharge **10% of income Tax if total income is above**
Rs. 10,00,000/-

Educational Cess **2% of the income tax**