Mathematics
CLASS X
Minimum Learning Program *for* Board Examinations

1.	Linear equations Graph	→	a) y form b) Tabular form c) Plotting points on Graph d) Writing solution x = ___, y = ___ e) Shading or what ever is asked. [4]
2.	HCF & LCM [3]	→	Finding the value of 'a' and 'b'
3.	Arithmetic Progression [6]	→	a = ? d = ? $S_n = \frac{n}{2}[2a + (n-1)d]$ 2 questions of 3 marks each
4.	Theorems	→	Two theorems if no figure→ no marks [remember!] [8]
5.	Constructions [4]	→	Write the steps whether asked or not.
6.	Arithmetic Mean [4]	→	See also f_1 and f_2 question
7.	Pie chart	→	2 marks for getting degrees, 2 marks for diagram. [4]
8.	Probability [4]	→	Total Out comes, Possible outcomes
9.	Trigonometry [4]	→	(90 - θ) problems only
10. [3]	Instalment Schemes	→	First Model – to find the rate of interest

Second Model – rpayment of loans [3]

11. Income Tax → Study the conditions given under the question carefully for Donations, Savings, Tax rates, Education Cess, tax alreadypaid etc. [6]

12. Coordinate Geometry → 2 questions in 4 marks type [8]

TOTAL MARKS YOU CAN GET [60]

Time allowed: 3 hrs **Class**

(X)

Max. Marks 100

Mathematics

General Instructions

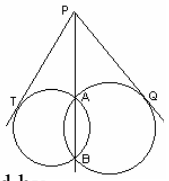
1) All questions are compulsory
2) The question paper consist of 25 questions divided into three sections A, B, C. Section A contains 10 questions of 3 marks each, section B is of 10 questions of 4 marks each and section C is of 5 questions of 6 marks each.
3) There is no overall choice. However, internal choice has been provided into two questions of each section.
4) Write the serial number of the question before attempting it.
5) In question on construction, the drawing should be neat and exactly as per the given measurements.
6) Use of calculators is not allowed.

Section – A

(3 marks questions)

1. Solve the following system of equations 2x + y = 35 and 3x + 4y = 65. Find the value of x/y

2. Reduce the following rational expression to its lowest form: $\frac{x(x^2 - 3x + 2)}{x^2 y - 2xy}$



3. In the figure, prove that PT = PQ

4. An electric lamp is available for Rs.1500 cash or for Rs.360 cash down payment followed by three monthly instalments of Rs.390 each. Find the rate of interest charged.

5. A TV set is available for Rs.19650 cash payment or for Rs.3100 cashdown payment and 3 equal annual instalments. If the shopkeeper charges interest at the rate of 10% p.a. compounded annually. Calculate the amount of each installment.

6. Find the LCM of the following: $12(x^2 - 36)$ and $8(x^2 + 5x - 6)$

7. Find two consecutive odd natural numbers the sum of whose squares is 202. (Or) The sum of two natural numbers is 8. Determine the numbers, if the sum of their reciprocals is 8 / 15

8. Find the sum of first 51 terms of an AP whose second term is 2 and 4th term is 8. (Or) How many terms are there in an AP whose first and fifth terms are –14 and 2 respectively and the sum of the terms is 40.

9. Find the sum of first 24 terms of the sequence whose n^{th} term is given by $a_n = 3 + (2/3)n$

10. AB is a diameter and AC is a chord of a circle such that $\angle BAC = 30°$. The tangent at C intersects AB produced in point D. Prove that BC = BD.

Section – B

(4 marks questions)

11. Solve for x : $\frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6}$ $(x \neq 3,\ x \neq -5)$

12. Draw the graph of x + 2y – 7 = 0 and 2x – y – 4 = 0. Shade the area bounded by these lines and y-axis.

13. Construct a <ABC in which AB = 6cm, AC = 7cm and BC = 8cm. Costruct <A'BC' similar to <ABC whose sides are (7/5)th of the corresponding sides of the given triangle ABC.

14. A rectangular sheet of paper 30cm X 18cm can be formed into the curved surface of a right circular cylinder in two ways. Find the ratio of the volumes of the two cylinders thus formed.

15. Prove that: $\tan^2\theta + \cot^2\theta + 2 = \sec^2\theta.\text{cosec}^2\theta$

    (Or) Evaluate: $\cos(40+\theta) - \sin(50-\theta) + \frac{\cos^2 40 + \cos^2 50}{\sin^2 40 + \sin^2 50}$

16. Prove that the triangle whose vertices are given as (10,-8), (3,6) and (-5,2) is an isosceles triangle.
    (Or) Find the point on x-axis which is equidistant from (-2,5) and (2,-3)

17. If A and B are (1,4) and (5,2) respectively, find the co-ordinates of P when AP:PB = 3:4

18. If the mean of the following data is 25, find 'k'

x	5	15	25	35	45
f	3	k	3	6	2

19. 17 cards numbered 1,2,3, ...16, 17 are put in a box and mixed thoroughly. One person draws a card from the box. Find the probability that the number on the card is (i) odd (ii) a prime (iii) divisible by 3.

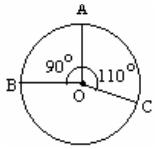
20. A family spends Rs.500 on rent, Rs.500 on food, Rs.300 on transport, Rs.200 on clothes and Rs.300 on miscellaneous items on an average. Construct a pie chart for the above expenses incurred by the family.

Section – C

(6 marks questions)

21. Prove that the angle subtended by an arc of a circle at its centre is double the angle subtended by it at any point on the remaining part of the circle.

    In the figure, A, B and C are three points on a circle with centre O such that $\angle AOB = 90°$ and $\angle AOC = 110°$. Determine $\angle BAC$.



22. The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides. – Prove. The areas of two similar triangles ABC and PQR are $64cm^2$ and $121cm^2$ respectively. If QR = 15.4cm, find the length of BC.

23. A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff. At point on the plane 70 metres away from the tower, an observer notices that the angles of elevation of the top and bottom of the flag staff are respectively 60° and 45°. Find the height of the flag staff and that of the tower.

    (Or) A round balloon of radius 'r' subtends an angle 'α' at the eye of a the observer while the angle of elevation of itscentre is 'β'. Prove that the height of the centre of the balloon is $r.sin\beta.cosec(\alpha/2)$

24. A right triangle has its sides containing right angle are 5cm and 12cm. Find the volume of the double cone formed when the triangle is revolved about its hypotenuse.

    (Or) The height of a cone is 30cm. A small cone is cut off at the top by a plane parallel to the base. If the volume be 1/27 of the volume of the given cone, at what height above the base is the section has been made?

25. The total annual income of Rahim is Rs.280000 (exclusive of HRA). He donates Rs.10000 to a charitable trust earning 50% exemption from tax. He contributes Rs.4000 per month towards his PF and pays Rs.20000 as an annual premium for his LIC and purchases National Savings Certificates worth Rs.15000. Calculate income tax payable by Rahim in the financial year. – Assume the following for calculating income tax.

(i) for Ladies:

Upto Rs.135000	No tax
Rs.135001 to 150000	10% of the amt. exceeding Rs.135000
Rs.150001 to 250000	Rs.1500 + 20% of the amt. exceeding Rs.150000
above Rs.250000	Rs.11500 + 30% of the amt. exceeding Rs.250000

(ii) for Senior Citizens (aged above 65 years)

Upto Rs.185000	No tax
Rs.185001 to 250000	20% of the amt. exceeding Rs.185000
above Rs.250000	Rs.3000 + 30% of the amt. exceeding Rs.250000

(iii) for others:

Upto Rs.100000	No tax
Rs.100001 to 150000	10% of the amt. exceeding Rs.100000
Rs.150001 to 250000	Rs.5000 + 20% of the amt. exceeding Rs.150000
above Rs.250000	Rs.25000 + 30% of the amt. exceeding Rs.250000

* Surcharge of 10% of the tax if the annual income more than Rs.10 lakhs.

** Educational cess of 2% of the net tax payable.