

Class-X (2018–19) / Mathematics / Pre Board Examination**Time allowed: 3 Hours Max. Marks: 80****General Instructions:**

- (i) All questions are compulsory.
- (ii) The question paper consists of 30 questions divided into four sections A, B, C and D.
- (iii) Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

Section A / 1 mark

1. Use Euclid's division algorithm to find the HCF of 135 and 225.
2. Solve the equation $x^2 + 4x + 3 = 0$ by the method of completing the square.
3. Which term of the AP : 21, 18, 15, . . . is $- 81$?
4. Let $\Delta ABC \sim \Delta DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2 . If $EF = 15.4 \text{ cm}$, find BC .
5. Find a relation between x and y such that the point (x, y) is equidistant from the points $(7, 1)$ and $(3, 5)$.
6. If $5 \sin A = 3$ calculate $\tan A$.

Section B / 2 marks

7. There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?
8. Find the value of k , for which the equations $3x - y + 8 = 0$ and $6x - ky = -16$ represent a pair of coincident lines?
9. Determine the AP whose third term is 16 and the 7th term exceeds the 5th term by 12.
10. Find the coordinates of the points of trisection of the line segment joining the points $A(2, -2)$ and $B(-7, 4)$.
11. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, determine the number of blue balls in the bag.
12. What is the chance that a leap year will have 52 Sundays ?

Section C / 3 marks

13. Prove that $\sqrt{3}$ is irrational.
14. Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$, and verify the relationship between the zeroes and the coefficients.
15. Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages ?

Or

Solve graphically : $x + 3y = 6$ and $2x - 3y = 12$

16. Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of ΔPQR . Show that $\Delta ABC \sim \Delta PQR$.

17. Prove that the parallelogram circumscribing a circle is a rhombus.

Or

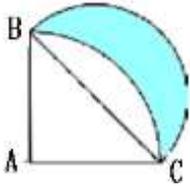
Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

18. If $A(-5, 7)$, $B(-4, -5)$, $C(-1, -6)$ and $D(4, 5)$ are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

19. If $\sin(A - B) = 1/2$ and $\cos(A + B) = 1/2$ where $0 < A + B \leq 90$, $A > B$.

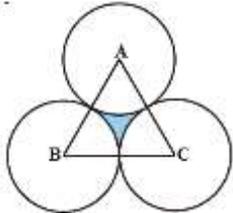
Find A and B.

20. In the given figure ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.



or

The area of an equilateral triangle ABC is 17320.5 cm^2 . With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle. Find the area of the shaded region. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73205$)



21. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2 .

Or

A hemispherical tank full of water is emptied by a pipe at the rate of $3 \frac{4}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? (Take $\pi = 22/7$)

22. Find median of the following data.

Age	16 – 25	26 – 35	36 – 45	46 – 55	56 – 65	66 – 75
No. of residents	10	10	25	25	20	10

Section D / 4 marks

23. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

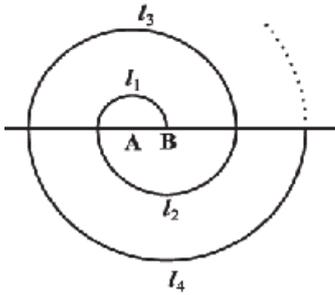
Or

Sum of the areas of two squares is 468 m^2 . If the difference of their perimeters is 24 m, find the sides of the two squares.

24. 200 logs are stacked in the following manner : 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on. In how many rows are the 200 logs placed and how many logs are in the top row?

Or

A spiral is made up of successive semicircles, with centres alternately at A and B, starting with centre at A, of radii 0.5 cm, 1.0 cm, 1.5 cm, 2.0 cm, . . . as shown in the figure. What is the total length of such a spiral made up of thirteen consecutive semicircles? (Take $\pi = 22/7$)



25. State and prove the converse of Pythagoras theorem.

26. Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are $5/3$ times the corresponding sides of the given triangle. Give steps of construction.

Or

Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle. Give steps of construction.

27. Show : $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$.

28. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45° , respectively. Find the height of the multi-storeyed building and the distance between the two buildings.

29. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $1/15$ cm, find the length of the wire.

30. The following distribution gives the daily income of 50 workers of a factory.

Daily income (in Rs)	100 - 120	120 - 140	140 - 160	160 - 180	180 - 200
Number of workers	12	14	8	6	10

Draw both ogives for the data above. Hence obtain the median income.

End.

**Blueprint
Syllabus / distribution of marks**

Chap no.	Chap name	Distribution	Total marks	
Chap 1	Real Numbers.	1 + 2 + 3	6	6
Chap 2	Polynomials	3	3	} 20
Chap 3	Linear equations	2 + 3	5	
Chap 4	Quadratic Equations	1+ 4	5	
Chap 5	A.P.	1+ 2 + 4	7	
Chap 6	Similar Triangles	1+ 3 + 4	8	} 15
Chap 10	Circles	3	3	
Chap 11	Construction	4	4	
Chap 7	Coordinate geometry	1 + 2 + 3	6	6
Chap 8	Trigo	1 + 3 + 4	8	} 12
Chap 9	Heights & distances	4	4	
Chap 12	Area related to circles	3	3	} 10
Chap 13	Surface area and vol	3 + 4	7	
Chap 14	Stats	3 + 4	7	} 11
Chap 15	Probability	2 + 2	4	
				80 marks

Paper design

1 mark x 6 Q's = 6 marks

2 marks x 6 Q's = 12 marks

3 marks x 10 Q's = 30 marks

4 marks x 8 Q's = 32 marks

30 Q's / 80 marks ..

end.