CBSE
Sample Question Paper 1

Mathematics
Class X

Time : 3 hrs **MM: 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 and Section D comprises of 8 questions of 4 marks each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, 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.

(v) Use of calculators is not permitted.

SECTION A

(1 × 6 = 6)

1. H.C.F and L.C.M of two numbers are same. Find the difference between the two numbers.

2. If two roots of quadratic equation: $ax^2 + bx + c = 0$, $a \neq 0$ are equal in magnitude but opposite in sign then, find the value of b.

OR

The roots of the quadratic equation $2x^2 - x - 6 = 0$ are

(*a*) $-2, \frac{3}{2}$ (*b*) $2, -\frac{3}{2}$ (*c*) $-2, -\frac{3}{2}$ (*d*) $2, \frac{3}{2}$

3. Is it true to say that the pair of equations

$$-x + 2y + 2 = 0 \text{ and } \frac{1}{2}x - \frac{1}{4}y - 1 = 0$$

has a unique solution? Justify your answer.

OR

$x = 2$, $y = 3$ is a solution of the linear equation:

(*a*) $2x + 3y - 13 = 0$ (*b*) $3x + 2y - 31 = 0$

(*c*) $2x - 3y + 13 = 0$ (*d*) $2x + 3y + 13 = 0$

4. Find the 9th term from the end (towards the first term) of the A.P.5, 9, 13, ..., 185.

5. Why is it not possible to construct a pair of tangents from a point P situated at a distance of 3 cm from the center of a circle of radius 3.5cm?

6. Two dice are thrown together. Find the probability of getting the same number on both dice.

SECTION B

(2 × 6 = 12)

7. "The product of three consecutive positive integers is divisible by 6". Is this statement true or false? Justify your answer.

OR

Find how many integers between 200 and 500 are divisible by 8.

8. If sum of the squares of zeros of the quadratic polynomial $f(x) = x^2 - 8x + k$ is 40, find the value of k.

OR

Find the quadratic polynomial whose sum and product of the zeroes are $\frac{21}{8}$ and $\frac{5}{16}$ respectively.

9. A two digit number is four times the sum of the digits. It is also equals to 3 times the product of digits. Find the number.

10. If $x = a \cos \theta$, $y = b \sin \theta$, then find the value of $b^2 x^2 + a^2 y^2 - a^2 b^2$.

11. In a ΔABC, if $\angle C = 90°$, prove that $\sin^2 A + \sin^2 B = 1$.

12. If the total surface area of a solid hemisphere is $462 cm^2$, find its volume. $\left[\text{Take } \pi = \frac{22}{7}\right]$

SECTION C

(3 × 10 = 30)

13. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

14. Find the condition that the zeros of the polynomial $f(x) = x^3 - px^2 + qx - r$ may be in arithmetic progression.

15. Solve: $ax + by = a - b$ and $bx - ay = a + b$ for x & y.

OR

Solve for u & v : $3(2u + v) = 7uv$

$3(u + 3v) = 11uv$

16. How many terms of the series 54, 51, 48, ... should be taken so that their sum is 513? Explain the double answer.

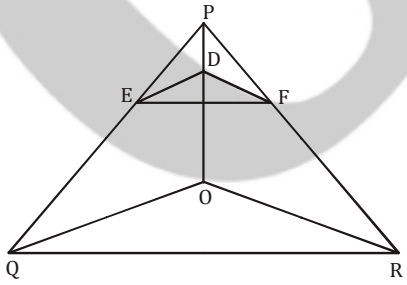
17. Prove that the area of triangle whose vertices are (t, t – 2), (t + 2, t + 2) and (t + 3, t) is independent of t.

18. In what ratio does the point P(p, –1) divide the line segment joining the points A(l, –3) and B(6, 2)? Hence, find the value of p.

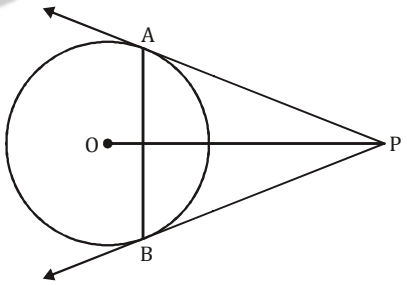
OR

Point M(11, y) lies on the line segment joining the points P(15, 5) and Q(9, 20). Find the ratio in which point M divides the line segment PQ. Also find the value of y.

19. In Fig. DE || OQ and DF || OR, Show that EF || QR.



20. From an external point P, two tangents PA and PB are drawn to a circle with center O as shown in the adjoining figure. Show that OP is the perpendicular bisector of AB.



21. The mean of the following distribution is 50. If the sum of the frequencies is 120, find the values of f_1 and f_2:

x_i	10	30	50	70	90
f_i	17	f_1	32	f_2	19

OR

Calculate the average daily income (in) of the following data about men working in a company :

Daily income (in)	Less than 100	Less than 200	Less than 300	Less than 400	Less than 500
Number of men	12	28	34	41	50

22. In a game, the entry fee is Rs. 5. The game consists of tossing a coin 3 times. If one or two heads show, Sweta gets her entry fee back. If she throws 3 heads, she receives double the entry fees. Otherwise she will lose. For tossing a coin three times, find the probability that she

(*i*) loses the entry

(*ii*) gets double entry fee

(*iii*) just gets her entry fee

OR

A jar contains 54 marbles each of which is blue, green or white. The probability of selecting a blue marble at random from the jar is $\frac{1}{3}$, and the probability of selecting a green marble at random is $\frac{4}{9}$. How many white marbles does the jar contain?

SECTION D

(4 × 8 = 32)

23. A thief runs with a uniform speed of 100 m/minute. After one minute a policeman runs after the thief to catch him. He goes with a speed of 100 m/minute in the first minute and increases his speed by 10 m/minute every succeeding minute. After how many minutes the policeman will catch the thief? (Depict the volus)

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

OR

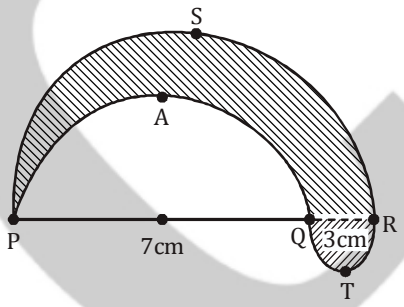
ABC is a triangle in which AB = AC and D is a point on AC such that $BC^2 = AC \times CD$. Prove that BD = BC.

25. Prove that : $\frac{1}{(\text{cosec } x + \cot x)} - \frac{1}{\sin x} = \frac{1}{\sin x} - \frac{1}{(\text{cosec } x - \cot x)}$

26. A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60°. When he moves 40 metres away from the bank, he finds the angle of elevation to be 30°. Find the height of the tree and the width of the river.

27. Draw a triangle ABC in which AB = 4 cm, BC = 6 cm and AC = 9 cm. Construct a triangle similar to ΔABC with scale factor $\frac{3}{2}$. Justify the construction. Are the two triangles congruent? Note that all the three angles and two sides of the two triangles are equal.

28. In Fig. PSR, RTQ and PAQ are three semicircles of diameters 10 cm, 3 cm and 7 cm respectively. Find the perimeter of the shaded region. (Use π = 3.14)



OR

In a circle of radius 21 cm an arc subtends an angle of 60° at the centre. Find (i) the length of the arc, (ii) the area of the sector bounded by the arc and (iii) the area of the segment made by this arc.

29. A cone of radius 10 cm is divided into two parts by drawing a plane through the mid-point of its axis, parallel to its base. Compare the volumes of the two parts.

30. The distribution below gives the marks of 100 students of a class.

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Number of students	4	6	10	10	25	22	18	5

Draw a less than type and a more than type ogive from the given data. Hence, obtain the median marks from the graph.

OR

Apply step-deviation method to find the Average mean of the following frequency distribution

Variate (x) :	5	10	15	20	25	30	35	40	45	50
Frequency (f) :	20	43	75	67	72	45	39	9	8	6