CBSE Sample Paper -05

SUMMATIVE ASSESSMENT –I

Class – X Mathematics

Time allowed: 3 hours | Maximum Marks: 90

General Instructions:

a) All questions are compulsory.
b) The question paper comprises of 31 questions divided into four sections A, B, C and D. You are to attempt all the four sections.
c) Questions 1 to 4 in section A are one mark questions.
d) Questions 5 to 10 in section B are two marks questions.
e) Questions 11 to 20 in section C are three marks questions.
f) Questions 21 to 31 in section D are four marks questions.
g) There is no overall choice in the question paper. Use of calculators is not permitted.

SECTION – A

1. Prove that $\cos1°\cos2°\cos3°\ldots\ldots\cos180° = 0$.
2. If two zeros of the polynomial $f(x) = x^3 - 4x^2 - 3x + 12$ are $\sqrt{3}$ and $-\sqrt{3}$, then find its third zero.
3. Evaluate: $\tan5°\tan25°\tan30°\tan65°\tan85°$
4. Find the mode of the following data:
   120, 110, 130, 110, 120, 140, 130, 120, 140, 120

SECTION – B

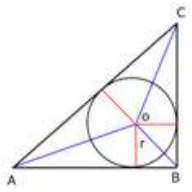
5. The perimeters of two similar triangles are 30 cm and 20 cm. If one side of the first triangle is 12 cm, determine the corresponding side of the second triangle.
6. Prove that the polynomial $x^2 + 2x + 5$ has no zero.
7. The areas of two similar triangles ABC and PQR are 64 cm^2 and 121 cm^2 respectively. If QR = 15.4 cm, find BC.
8. For any positive real number x, prove that there exists an irrational number y such that $0 < y < x$.
9. Given that $\sin(A + B) = \sin A\cos B + \cos A\sin B$, find the value of $\sin75°$.
10. Find the values of α and β for which the following system of linear equations has infinite number of solutions. $2x + 3y = 7$, $2\alpha x + (\alpha + \beta)y = 28$

SECTION – C

11. Find the largest positive integer that will divide 398, 436 and 542 leaving remainders 7, 11 and 15 respectively.

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

13. ABC is a right-angled triangle right angled at A. A circle is inscribed in it the lengths of two sides containing the right angle are 6 cm and 8 cm. Find the radius of the circle.



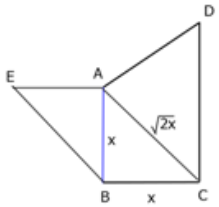
14. Find the four angles of a cyclic quadrilateral ABCD in which $\angle A = (2x - 5)°$, $\angle B = (y + 5)°$, $\angle C = (2y + 15)°$ and $\angle D = (4x - 7)°$.

15. A student noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarised it in the table given below. Find the mode of the data.

Number of cars	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	7	14	13	12	20	11	15	8

16. In aΔABC, right angled at B, if AB = 4 and BC = 3, find all the six trigonometric ratios of $\angle A$.

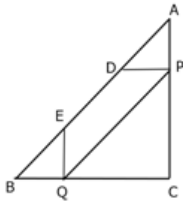
17. ABC is an isosceles triangle right-angled at B. Similar triangles ACD and ABE are constructed on sides AC and AB. Find the ratio between the areas of ΔABE and ΔACD.



18. I am 3 times as old as my son. 5 years later, I shall be two and a half times as old as my son. How old am I and how old is my son?

19. Prove $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$.

20. Let ABC be a triangle and D and E be two points on side AB such that AD = BE. If DP || BC and EQ || AC, then prove that PQ || AB.



SECTION – D

21. The denominator of a fraction is 4 more than twice the numerator. When both the numerator and denominator are decreased by 6, then the denominator becomes 12 times the numerator. Determine the fraction.

22. If cosecA = 2, find the value of $\frac{1}{\tan A}+\frac{\sin A}{1+\cos A}$.

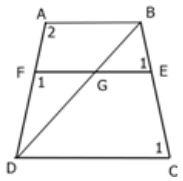
23. If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, prove that $x^2 + y^2 = 1$.

24. A frequency distribution of the life times of 400 T.V. picture tubes tested in a company is given below. Find the average life of a tube.

Life time (in hours)	Frequency	Life time (in hours)	Frequency
300-399	14	800-899	62
400-499	46	900-999	48
500-599	58	1000-1099	22
600-699	76	1100-1199	6
700-799	68		

25. What must be added to $f(x) = 4x^4 + 2x^3 - 2x^2 + x - 1$ so that the resulting polynomial is divisible by $g(x) = x^2 + 2x - 3$?

26. In trapezium ABCD, AB || DC and DC = 2AB. A line EF drawn parallel to AB cuts AD in F and BC in E such that $\frac{BE}{EC}=\frac{3}{4}$. Diagonal DB intersects EF at G. Prove that 7FE = 10AB.



27. Solve the following system of linear equations graphically.

$x - y = 1$

$2x + y = 8$

Shade the area bounded by these two lines and y-axis. Also, determine this area.

28. Prove that the internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle.

29. Following is the age distribution of a group of students. Draw the cumulative frequency polygon, cumulative frequency curve (less than type) and hence obtain the median value.

Age	Frequency	Age	Frequency
5-6	40	11-12	92
6-7	56	12-13	80
7-8	60	13-14	64
8-9	66	14-15	44
9-10	84	15-16	20
10-11	96	16-17	8

30. Prove $\frac{(1+\cot A+\tan A)(\sin A-\cos A)}{\sec^3 A-\operatorname{cosec}^3 A}=\sin^2 A\cos^2 A$

31. In a housing society, people decided to do rainwater harvesting. Rainwater is collected in the underground tank at the rate of 30 cm^3/sec. Taking volume of water collected in x seconds as $y cm^3$.

    a. Form a linear equation.

    b. Write it in standard form as $ax + by + c = 0$.

    c. Which values are promoted by the members of this society?