CBSE Sample Paper -03
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. Explain why $7 \times 11 \times 13 + 13$ is a composite number.

2. ABC is an isosceles triangle with AC = BC. If $AB^2 = 2AC^2$, prove that ∆ABC is a right triangle.

3. If tanA = cotB, prove that A + B = 90°.

4. Evaluate cos60°cos30° + sin60°sin30°.

SECTION – B

5. If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - px + q$, then find the value of $\dfrac{1}{\alpha} + \dfrac{1}{\beta}$.

6. Following table shows the weight of the bags of 12 students:
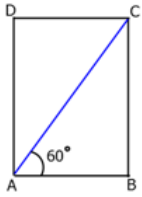
Weight (Kg)	67	70	72	73	75
Number of students	4	3	2	2	1

Find the mean weight.

7. E is a point on side AD produced of a parallelogram ABCD and BE intersects CD at F. Prove that ∆ABE~∆CFB.
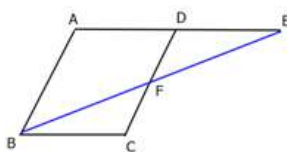
8. In a rectangle ABCD, AB = 20 cm, ∠BAC = 60°. Calculate side BC.

9. There is a circular path around a sports field. Prenu takes 18 minutes to drive 1 round of the field, while Raj 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?

10. Find a cubic polynomial with the sum, sum of the products of its zeros taken two at a time, and product of its zeros as 2, –7 and –14, respectively.

SECTION – C

11. Prove that $\sqrt{2}+\sqrt{5}$ is irrational.

12. Prove that $\dfrac{\sec\theta+\tan\theta-1}{\tan\theta-\sec\theta+1}=\dfrac{\cos\theta}{1-\sin\theta}$

13. If $a\cos\theta - b\sin\theta = c$, prove that $a\sin\theta + b\cos\theta = \pm\sqrt{a^2+b^2-c^2}$.

14. Points A and B are 70 km apart on a highway. A car starts from a and another car starts from B at the same time. If they travel in same direction, they meet in 7 hours but if they travel in opposite direction, they meet in one hour. What are their speeds?

15. If the zeros of the polynomial $x^3 - 3x^2 + x + 1$ are $a - b$, a and $a + b$. Find a and b.

16. If the diagonals of a quadrilateral divide each other proportionally, the quadrilateral is a trapezium.

17. If the areas of two similar triangles are equal, prove that they are congruent.

18. Evaluate $\dfrac{\cos 45°}{\sec 30° + \cosec 30°}$.

19. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield (kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	2	8	12	24	38	16

Change the distribution to a more than type distribution and draw its ogive.

20. A 2-digit number is such that the product of its digits is 14. If 45 is added to the number, the digits interchange their places. Find the number.

SECTION – D

21. Prove that every positive integer different from 1 can be expressed as a product of non-negative power of 2 and an odd number.

22. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$, respectively. Find $g(x)$.

23. State and prove Pythagoras theorem.

24. Students of a class are made to stand in rows. If one student is extra in a row, there would be 2 rows less. If one student is less in a row, there would be 3 rows more. Find the number of students in the class.

25. If ∠B and ∠Q are acute angles such that sinB = sinQ, then prove that ∠B = ∠Q.
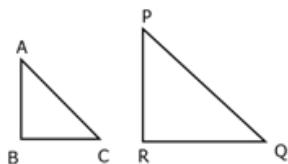
26. Solve the following system of equations in x and y

$$(a-b)x + (a+b)y = a^2 - 2ab - b^2$$

$$(a+b)(x+y) = a^2 + b^2$$

27. During the medical checkup of 35 studetns of a class, their weights were recorded as follows:

Weight (kg)	Less than 38	Less than 40	Less than 42	Less than 44	Less than 46	Less than 48	Less than 50	Less than 52
Number of students	0	3	5	9	14	28	32	35

Draw a less than type ogive for the given data. Hence, obtain the median weight from the graph and verify the result by using the formula.

28. If $\cot\theta = \dfrac{7}{8}$, evaluate $\dfrac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$.

29. Prove that the line segments joining the mid-points of the sides of a triangle form four triangles each of which is similar to the original triangle.

30. Let a, b, c and d be positive rationals such that $a + \sqrt{b} = c + \sqrt{d}$, then either $a = c$ and $b = d$ or b and d are squares of rationals.

31. A man hires a taxi to cover a certain distance. The fare is Rs 50 for first kilometre and Rs 25 for subsequent kilometers. Taking total distance covered as *x* km and total fare as *y*:

   a. Write a linear equation for this.

   b. The man covers a distance of 10 km and gave Rs 300 to the driver. Driver said "It is not the correct amount" and returned him the balance. Find the correct fare and the amount paid back by the driver.

   c. Which values are depicted by the driver in the question?

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