SUMMATIVE ASSESSMENT – I , 2014-2015
MATHEMATICS CLASS – X

Time allowed : 3 hours | Maximum Marks : 90

General Instruction:

(i) All questions are compulsory.
(ii) The question paper consists of 31 questions divided into four sections A, B. C and D.
(iii) Section A contains 4 multiple-choice 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 11 questions of 4 marks each.
(iv) Use of calculator is not permitted.

SECTION – A

1. If the sum of the zeroes of the polynomial f(x) = $2x^3 - 3kx^2 + 4x - 5$ is 6, then value of k is
(a) 2 (b) 4 (c) –2 (d) – 4

2. Euclid's division lemma state that for any positive integers a and b, there exist unique integers q and r such that a = bq + r where r must satisfy
(a) $1 < r < b$ (b) $0 < r \leq b$ (c) $0 \leq r < b$ (d) $0 < r < b$

3. The value of k for which the system of equations x – 2y = 3 and 3x + ky = 1 has a unique solution is
(a) k = – 6 (b) k ≠ – 6 (c) k = 0 (d) no value

4. If $\Delta ABC \sim \Delta PQR$, BC = 8 cm and QR = 6 cm, the ratio of the areas of Δ ABC and Δ PQR is
(a) 8 : 6 (b) 6 : 8 (c) 64 : 36 (d) 9 : 16

SECTION – B

5. Using Euclid's division algorithm, find the HCF of 2160 and 3520.

6. If secA + tanA = m and secA – tanA = n, find the value of $\sqrt{mn}$.

7. If A and B are angles of right angled triangle ABC, right angled at C, prove that
$\text{Sin}^2 A + \text{Sin}^2 B = 1$

8. Two poles of heights 6 m and 11 m stand on a plane ground. If the distance between the feet of the poles is 12 m, find the distance between their tops.

9. If one zero of the polynomial $(a^2 + 9)x^2 + 13x + 6a$ is reciprocal of the other. Find the value of a.

10. The larger of the two supplementary angles exceeds the smaller by 18 degrees. Find the angles.

SECTION – C

11. If α, β are the zeroes of the polynomials f(x) = $4x^2 + 3x + 7$, then find the value of $\frac{1}{\alpha}+\frac{1}{\beta}$

12. Find the quotient and remainder when $4x^3 + 2x^2 + 5x - 6$ is divided by $2x^2 + 3x + 1$.

13. Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks have been deducted for each incorrect answer, then Yash would have scored 50 marks. How many questions were there in the test?

14. Prove that: $\dfrac{1}{\operatorname{cosec} A - \cot A} - \dfrac{1}{\sin A} = \dfrac{1}{\sin A} - \dfrac{1}{\operatorname{cosec} A + \cot A}$.

15. If $a^2 \sec^2\theta - b^2\tan^2\theta = c^2$, prove that $\sin^2\theta = \dfrac{c^2 - a^2}{c^2 - b^2}$

16. If a line intersects sides AB and AC of a ΔABC at D and E respectively and is parallel to BC, prove that $\dfrac{AD}{AB} = \dfrac{AE}{AC}$

17. Find the mean marks by step deviation method from the following data:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50
Number of students	15	45	90	102	120

18. Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.

19. The median of the following data is 167. Find the values of x.

Height(in cm)	160-162	163-165	166-168	169-171	172-174
Frequency	15	117	x	118	14

20. Find the mode of the following frequency distribution:

Marks	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of students	15	30	45	12	18

SECTION – D

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

22. Show that the square of an odd positive integer can be of the form $6q + 1$ or $6q + 3$ for some integer q.

23. If a and b are two odd positive integers such that a > b, then prove that one of the two numbers $\dfrac{a+b}{2}$ and $\dfrac{a-b}{2}$ is odd and the other is even.

24. If $a\cos^3\theta + 3a\sin^2\theta\cos\theta = m$ and $a\sin^3\theta + 3a\sin\theta\cos^2\theta = n$, prove that $(m+n)^{2/3} + (m-n)^{2/3} = 2a^{2/3}$

25. If the median of the distribution given below is 28.5, find the values of x and y.

C. I.	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
F	5	x	20	15	y	5	100

26. If two zeroes of the polynomial $x^4 + 3x^3 - 20x^2 - 6x + 36$ are $\sqrt{2}$ and $-\sqrt{2}$, find the other zeroes of the polynomial.

27. Draw more than ogive for the following frequency distribution:

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of students	5	8	6	10	6	6

Also find the median from the graph and verify that by using the formula.

28. Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

29. Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio".

30. Evaluate without using tables: $\dfrac{\sec\theta \operatorname{cosec}(90^0 - \theta) - \tan\theta \cot(90^0 - \theta) + (\sin^2 35^0 + \sin^2 55^0)}{\tan 10^0 \tan 20^0 \tan 45^0 \tan 70^0 \tan 80^0}$

31. Prove that: $\dfrac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$.

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Unit/Topic	MCQ (1 mark)	Short answer (2 marks)	Short answer (3 marks)	Long answer (4 marks)	Total
Number System Real numbers	1(1)	2(1)	--	8(2)	**11(4)**
Algebra Polynomials, Pair of Linear Equations in two variables	2(2)	4(2)	9(3)	8(2)	**23(9)**
Geometry Triangles	1(1)	2(1)	6(2)	8(2)	**17(6)**
Trigonometry	--	4(2)	6(2)	12(3)	**22(7)**
Statistics	--	--	9(3)	8(2)	**17(5)**
Total	4(4)	12(6)	30(10)	44(11)	**90(31)**