

SUMMATIVE ASSESSMENT - I, 2015

MATHEMATICS

Class - X

Time Allowed: 3 hours

Maximum Marks: 90

General Instructions:

1. All questions are **compulsory**.
2. The question paper consists of 31 questions divided into four sections A, B, C and D. Section-A comprises of 4 questions of 1 mark each; Section-B comprises of 6 questions of 2 marks each; Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 11 questions of 4 marks each.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

SECTION-A

Question numbers 1 to 4 carry one mark each

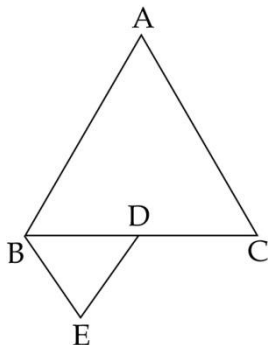
- 1 $\triangle ABC$ and $\triangle BDE$ are two equilateral triangles such that $BD = \frac{1}{3} BC$. Find the ratio of areas of $\triangle ABC$ and $\triangle BDE$. 1
- 2 Evaluate : $\sec^2 60^\circ + \sec 0^\circ$ 1
- 3 If $24 \cot A = 7$, find the value of $\sin A$. 1
- 4 In the frequency distribution , if $\sum f_i = 50$ and $\sum f_i x_i = 2550$, then what is the mean of the distribution ? 1

SECTION-B

Question numbers 5 to 10 carry two marks each.

- 5 How many irrational numbers lie between $\sqrt{2}$ and $\sqrt{3}$? Write any two of them. 2
- 6 Apply Euclid's division algorithm to find HCF of numbers 4052 and 420. 2
- 7 Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident : 2
 $3x + y = 7$
 $6x + 2y = 8$

- 8 ΔABC and ΔBDE are two equilateral triangles of sides 4 m and 2 m respectively. Find ratio of the ar(ΔABC) and ar(ΔBDE). 2



- 9 Simplify : 2

$$\frac{\tan 28^\circ}{\cot 62^\circ} \div \frac{1}{\sqrt{3}} [\tan 20^\circ \cdot \tan 60^\circ \cdot \tan 70^\circ]$$

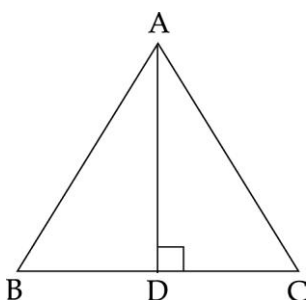
- 10 The data regarding marks obtained by 48 students of a class in a Class Test is given below. Calculate the modal marks of students. 2

Marks obtained	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Number of students	1	0	2	0	0	10	25	7	2	1

SECTION-C

Question numbers 11 to 20 carry three marks each.

- 11 Write 32875 as product of prime factors. Is this factorisation unique ? 3
- 12 If $x^4 - 2x^3 + 6x^2 - 6x + k$ is completely divisible by $x^2 - 2x + 3$, then find the value of k. 3
- 13 Solve for x and y : 3
- $$2x + y = 6$$
- $$2x - y + 2 = 0$$
- 14 Check whether polynomial $3x^2 - 5x + 2$ is a factor of the polynomial $3x^4 - 5x^3 - 10x^2 + 20x - 8$. Verify by division algorithm 3
- 15 If $AD \perp BC$ in ΔABC and $\frac{BD}{DA} = \frac{DA}{DC}$ then prove that ΔABC is a right angled triangle. 3



16 From airport two aeroplanes start at the same time. If speed of first aeroplane due North is 500 km/hr and that of other due East is 650 km/hr, then find the distance of two aeroplanes after 2 hours. 3

17 If $\sin \theta = \frac{21}{29}$; evaluate $\frac{\sec \theta}{\tan \theta - \sin \theta}$ 3

18 Prove that : 3
 $\sec^2 \theta - \cot^2 (90^\circ - \theta) = \cos^2 (90^\circ - \theta) + \cos^2 \theta$

19 A contractor paid daily wages to the labourers as follows : 3

Daily wage (in ₹)	200-250	250-300	300-350	350-400	400-450	450-500	500-550
Number of labourers	3	4	8	7	6	6	7

Find the median wages of the labourers.

20 In an apple orchard, the number of apples on 80 trees is given below : 3

Number of apples	40-50	50-60	60-70	70-80	80-90	90-100
Number of trees	15	25	14	12	8	6

Find the mean number of apple on a tree.

SECTION-D

Question numbers 21 to 31 carry four marks each.

21 State fundamental theorem of Arithmetic. Using it check whether there is any value of n for which 5^n ends with the digit zero. 4

22 A NGO decided to distribute books and pencils to the students of a school running by some other NGO. For this they collected some amount from different number of people. The total amount collected is represented by $4x^4 + 2x^3 - 8x^2 + 3x - 7$. The amount is equally divided between each of the students. The number of students, who received the amount is represented by $x - 2 + 2x^2$. After distribution, $5x - 11$, amount is left with the NGO which they donated to school for their infrastructure. Find the amount received by each student from the NGO. What value have been depicted here ? 4

23 On reversing the digits of a two digit number, number obtained is 9 less than three times the original number. If difference of these two numbers is 45, find the original number. 4

24 If a polynomial $x^4 - 6x^3 + 8x^2 + 6x - 9$ has two zeroes as 3 and -1 , then find the other zeroes. 4

25 Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides. 4

26 In a right $\triangle ABC$, right angled at B and D is any point on BC, then prove that $AC^2 = AD^2 + DC^2 + 2 BD \cdot DC$ 4

27 Prove that : 4

$$\frac{\sin^2\theta}{\cot\theta} + \frac{\cos^2\theta}{\tan\theta} + 2 \sin\theta \cdot \cos\theta = \sec\theta \cdot \operatorname{cosec}\theta = \tan\theta + \cot\theta$$

28 Prove that $b^2x^2 - a^2y^2 = a^2b^2$, if : 4

(i) $x = a \sec\theta$, $y = b \tan\theta$, or

(ii) $x = a \operatorname{cosec}\theta$, $y = b \cot\theta$;

29 Given that $\cos(A + B) = \cos A \cdot \cos B - \sin A \cdot \sin B$ and $\sin(A + B) = \sin A \cdot \cos B + \cos A \cdot \sin B$. Find the values of $\cos 75^\circ$ and $\sin 75^\circ$ by taking suitable values of A and B. 4

30 In a village, monthly expenditures of 200 families are shown in the following frequency distribution : 4

Expenditure (in ₹)	3000-3500	3500-4000	4000-4500	4500-5000	5000-□500	5500-6000
Number of families	24	60	x	26	32	y

If mode of the distribution is ₹ 3800, find the missing frequencies x and y .

31 Following table shows marks (out of 100) of students in a class test : 4

Marks	More than or equal to 0	More than or equal to 10	More than or equal to 20	More than or equal to 30	More than or equal to 40	More than or equal to 50	More than or equal to 60	More than or equal to 70	More than or equal to 80	More than or equal to 90	More than or equal to 100
Number of students	80	77	72	65	55	43	28	16	10	8	0

Draw 'more than type' ogive. From the curve, find median. Also check median by actual calculations.