SUMMATIVE ASSESSMENT – I, 2014
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.   1
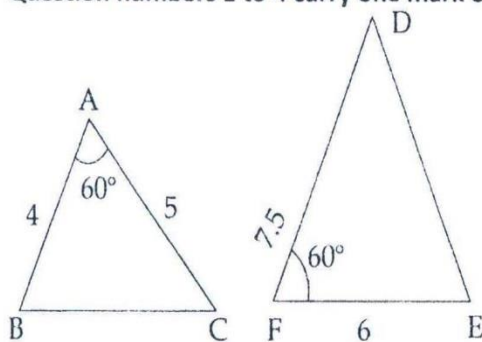
Are triangles ABC and FED similar?

2   If $\tan(3x + 30°) = 1$, then find the value of x.   1

3   In $\triangle ABC$, $\angle C = 90°$, $\angle A = 45°$ and $AB = 10$ cm. Find BC, using trigonometric ratios.   1

4   The mean of 50 observations is 20. If each observation is multiplied by 3, then what will be the   1
new mean ?

SECTION-B

Question numbers 5 to 10 carry two marks each.

5   Find the smallest positive rational number by which $\frac{1}{7}$ should be multiplied so that its   2
decimal expansion terminates after 2 places of decimal.

6   Determine the values of p and q so that the prime factorisation of 2520 is expressible as   2
$2^3 \times 3^p \times q \times 7$

7   Given the linear equation $3x-4y-7 = 0$, write another linear equation in these two variables   2
such that the geometrical representation of the pair so formed is :

(i)   intersecting lines   (ii)   parallel lines

8   P and Q are points on the sides AB and AC respectively of a triangle ABC such that AP=a,   2
PB=3a, QC=6b and AQ=2b, then find whether PQ∥BC.

9   If $x = p \sec \theta + q \tan \theta$ and $y = p \tan \theta + q \sec \theta$, then prove that $x^2 - y^2 = p^2 - q^2$

    2

10   Find the mean of the following distribution :

    2

Class Interval	0-6	6-12	12-18	18-24	24-30
Frequency	5	4	1	6	4

SECTION-C

Question numbers **11** to **20** carry three marks each.

11   Prove that $4 - \sqrt{3}$ is an irrational number.

    3

12   Check whether polynomial $3x^2-5x+2$ is a factor of the polynomial $3x^4-5x^3-10x^2+20x-8$. Verify by   3
division algorithm

13   If $x^4-2x^3+6x^2-6x+k$ is completely divisible by x^2-2x+3, then find the value of k.   3

14   Solve for x and y :   3

$\dfrac{5}{X} - 4Y + 3 = 0$

$\dfrac{7}{X} + 6Y - 19 = 0$

15   In two triangles ABC and PQR, if AD and PS are medians to △ABC and △PQR respectively   3
and △ABD ~ △PQS, then prove that △ABC ~ △PQR.

16   In a right angled △ABC, ∠B=90°. If $\dfrac{BC}{AB} = \dfrac{1}{\sqrt{3}}$, then find $\dfrac{AB}{AC}$.   3

17   In △ABC, right angled at C. if $\tan A = \dfrac{1}{\sqrt{3}}$, show that sinA. CosB+cosA. SinB = 1   3

Prove the identity :

$(\sec A - \cos A).(\cot A + \tan A) = \sec A. \tan A$

Monthly consumption of electricity of some consumers is given below as a distribution. Find   3
the missing frequency (x), if mode of distribution is given to be 200 units.

Monthly consumption (in units)	90-120	120-150	150-180	180-210	210-240
Number of consumers	20	15	x	75	30

During a medical check up of students of a class X, their weights were recorded as follows :   3

Weight (in kg)	less than 35	less than 38	less than 41	less than 44	less than 47	less than 50	less than 53
Number of students	0	4	6	·8	18	33	40

Draw a 'less than type' ogive for the above data, and hence obtain the median from the curve.

SECTION-D

Question numbers **21** to **31** carry four marks each.

1   Use Euclid's division lemma to show that the cube of any positive integer is of the form 9m,   4
9m+1 or 9m+8, where m is an integer.

2   Jhanavi wants to make a rectangular park for children and others to play. The area of the   4
park remains unchanged if its length is increased by 7 m and breadth is decreased by 3 m
unit. Its area remains unaffected if the length is decreased by 7 m and breadth is increased by
5 m. Find the dimension of the park. Why did Jhanavi decide to make a park ?

23   Two years ago, a father was five times old as his son. Two years later from today his age will be 8 years   4
more than three times the age of his son. Find their present ages.

24   Obtain all other zeroes of the polynomial $2x^4+3x^3-5x^2-9x-3$, if two of its zeroes are $\sqrt{3}$ and   4

$-\sqrt{3}$.

25 In the figure ABC and DBC are two triangles on the same base BC but in opposite direction. 4
    Prove that $\dfrac{ar(\triangle ABC)}{ar(\triangle DBC)} = \dfrac{AO}{DO}$
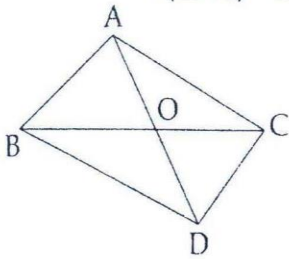
26 In $\triangle ABC$ if $AD \perp BC$ and $AD^2 = BD \times DC$, then prove that $\angle BAC = 90°$. 4

27 Prove that : 4

$$\left[\dfrac{\sin A}{1 + \cos A} + \dfrac{1 + \cos A}{\sin A}\right]\left[\dfrac{\cos A}{1 - \sin A} - \dfrac{1 - \sin A}{\cos A}\right] = 4\sec A$$

28 If $\cot\upsilon = \dfrac{15}{8}$, evaluate : 4

$$\dfrac{4\cot\upsilon - 5\sec\upsilon - 8\cos ec\upsilon}{5\tan\upsilon + 4\cot\upsilon - 17\sin\upsilon}$$
3

29 4

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

30 In the following frequency distribution, the weekly median cost of Living index is 1755. If total number 4
    of weeks is 52, then find the missing frequencies f_1 and f_2 in the distribution:

Cost of Living Index	1500 - 1600	1600 - 1700	1700 - 1800	1800 - 1900	1900 - 2000	2000 - 2100	2100 - 2200
Number of Weeks	4	f_1	f_2	8	4	3	2

32 4

On sports day of a school, age – wise participation of students is shown in the following distribution:

Age (in years)	5 – 7	7 – 9	9 – 11	11 – 13	13 – 15	15 – 17	17 - 19
Number of students	X	15	18	30	50	48	x

Find the mode of the data. Also find missing frequencies when sum of frequencies is 181.