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.

1 Find the length of the diagonal of a square whose each side is 8 cm.

2 If $\theta = 45°$, then find the value of $2\cosec^2\theta + 3\sec^2\theta$.

3 Find the value of $\cos\theta + \sec\theta$, when it is given that $\cos\theta = \dfrac{1}{2}$.

4 Monthly pocket money of 50 students of a class are given in the following distribution :

| Monthly pocket money (in ₹)	0-50	50-100	100-150	150-200	200-250	250-300
Number of students	2	7	8	30	12	1

Find modal class and also give class mark of the modal class.

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

6 Explain why $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 + 5$ is a composite number ?

7 Find the quadratic polynomial whose zeroes are $\sqrt{3}+\sqrt{5}$ and $\sqrt{5}-\sqrt{3}$.

8   In the figure, ΔOAD ~ ΔOBC. If ∠AOC = 90° and ∠OBC = 30°, find ∠ODA and ∠COB.
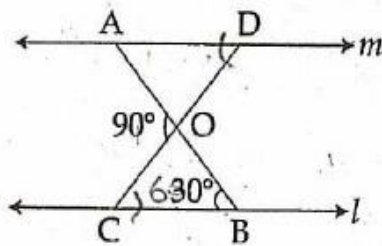
9   $\left[\dfrac{1 - \tan A}{1 - \cot A}\right]^2 = \tan^2 A$; ∠A is acute

10 Data regarding weights of students of class X of a school is given below. Calculate the average (Mean) weight of the students.

Weight (in kg)	50-52	52-54	54-56	56-58	58-60	60-62	62-64
Number of students	18	21	17	28	16	35	15

11 Pens are sold in pack of 8 and notepads are sold in pack of 12. Find the least number of pack of each type that one should buy so that there are equal number of pen and notepads.
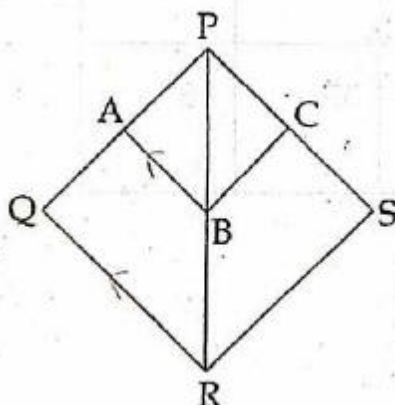
12 Check graphically whether the following pair of linear equations is consistent. If yes, solve it graphically :
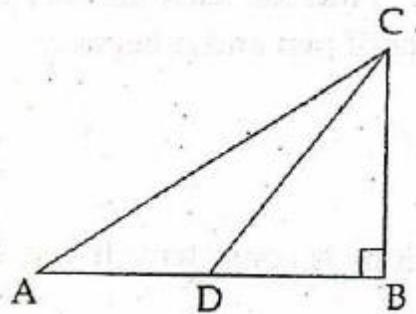
2x - 5 = 0 and x + y = 0

13 If $x^3 - 4x^2 + 5x - k$ is completely divisible by $x - 4$, then find the value of k.

14 Solve the following pair of equations : $49x + 51y = 499$ and $51x + 49y = 501$

15 In figure AB||QR and BC||RS. Prove that $\dfrac{PA}{PQ} = \dfrac{PC}{PS}$

16 In the figure if CD = 17 m, BD = 8 m and AD = 4 m, then find the value of AC.

17 Prove that : $(1 + \cot \theta - \operatorname{cosec} \theta) \cdot (1 + \tan \theta + \sec \theta) = 2$

18 If $\sin \theta = \dfrac{3}{5}$, evaluate $\dfrac{\operatorname{cosec} \theta - \cot \theta}{2 \cot \theta}$

19 In annual examination, marks (out of 90) obtained by students of class IX in mathematics are given below :

Marks	0-15	15-30	30-45	45-60	60-75	75-90
Number of students	2	4	5	20	9	10

Find the mean marks.

20 In a hospital, age record of diabetic patients was recorded as follows : Find median age.

Age (in years)	0-15	15-30	30-45	45-60	60-75
Number of patients	5	20	40	50	25

21 Find the HCF of 256 and 36 using Euclid's Division Algorithm. Also find their LCM and verify that HCF × LCM = product of the two numbers.

**22** Government of Delhi allotted Relief Fund to help the families whose houses and shops were burned in a fire accident. The fund is represented by $6x^3 - 11x^2 + 15x - 24$. The fund is equally divided between each of the families of that accident. Each family receives an amount of $3x - 7$. After distribution, $7x + 11$ amount is left. The District Magistrate decided to use this amount to develop the infrastructure of the area. Find the number of families which received relief fund from Government.

What value has been depicted here ?

23 Find all the zeroes of the polynomial $8x^4 + 8x^3 - 18x^2 - 20x - 5$, if it is given that two of its zeroes are $\sqrt{\dfrac{5}{2}}$ and $-\sqrt{\dfrac{5}{2}}$.

24 The area of a rectangle reduces by 25 sq. units, if its length is increased by 5 units and breadth is decreased by 3 units. If we increase length by 2 units and breadth by 5 units, the area increases by 285 sq. units. Find the dimensions of the rectangle.

25 In the figure $\angle BED = \angle BDE$ and E is the middle point of BC. Prove that $\dfrac{AF}{CF} = \dfrac{AD}{BE}$
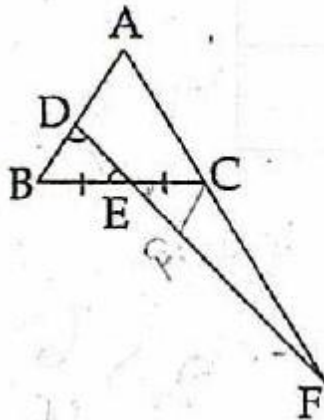
26   In a right $\triangle ABC$, right angled at B and D is any point on BC, then prove that
$$AC^2 = AD^2 + DC^2 + 2\, BD.DC$$

27   If $\sin\theta - \cos\theta = \sqrt{2}\,\cos\theta$, then prove that $\sin\theta + \cos\theta = \sqrt{2}\,\sin\theta$.

28   If $\cot\theta = 3x - \dfrac{1}{12x}$, then show that $\cot\theta + \operatorname{cosec}\theta = 6x$ or $-\dfrac{1}{6x}$

29   If $\sin\left(50° - \dfrac{3}{2}\alpha\right) = \cos(3\alpha - 50°)$, then find the value of α and hence evaluate :

$\tan\alpha.\,\sec\alpha.\,\sin\alpha. - \cot\alpha.\,\sin\alpha.\,\cos\alpha.$

30   In the following data, median of the runs scored by 60 top batsmen of the world in one-da international cricket matches is 5000. Find the missing frequencies x and y.

Runs scored	2500-3500	3500-4500	4500-5500	5500-6500	6500-7500	7500-8500
Number of batsmen	5	x	y	12	6	2

31   The given distribution shows number of wickets taken by the bowlers in one-day international cricket matches :

Number of wickets	Less than 15	Less than 30	Less than 45	Less than 60	Less than 75	Less than 90	Less than 105	Less than 120
Number of bowlers	2	5	9	17	39	54	70	80

Draw a 'less than type' ogive from the above. Find median from the curve. Verify median by actual calculations.

Best Of Luck by Jsunil