GYAN BHARATI SCHOOL
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. Two triangles ABC and DEF are similar. If AB = 3 cm, DE = 4 cm and   1

   area (ΔDEF) = 48 cm^2, then find area(ΔABC).

2. Evaluate : $\sin^2 31° - \cos^2 59°$ 1

3. Find the value of $\sin^2 12° + \sin^2 78°$.   1

4. In the business, of ready made garments which measure of central tendency is more   1
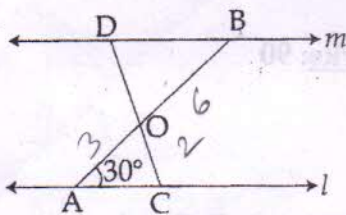   commonly used ?

SECTION-B

Question numbers **5 to 10** carry two marks each.

5. Find whether $5 \times 7 \times 11 \times 13 + 11$ is a prime number or a composite number.   2

6. After how many decimal places will the rational number $\dfrac{1251}{1250}$ terminate ?   2

7. Divide the polynomial $p(x) = x^3 - 4x^2 + 3x + 5$ by the polynomial $g(x) = x^2 - 1$ and find the   2
   quotient and the remainder.

8. In the figure, $l \parallel m$ and $\triangle OAC \sim \triangle OBD$. If $\angle OAC = 30°$, OA = 3 cm, OC = 2 cm and OB = 6 cm, find OD.

9. Find the value of θ, if

$$\frac{\cos\theta}{1 - \sin\theta} + \frac{\cos\theta}{1 + \sin\theta} = 4 \; ; \; \theta \le 90°.$$

2

10. Data regarding height of students of class X of model school, Dehradun is given below. Calculate the modal height of students of the class.

2

Height (in cms)	150-156	156-162	162-168	168-174	174-180
Number of students	4	7	15	8	6

SECTION-C

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

11. Show that square of any positive integer is either of the form $3m$ or $3m + 1$ for some integer m. 3

12. Solve the following pair of equations by reducing them to a pair of linear equations : 3

$$\frac{1}{x} - \frac{4}{y} = 2 \qquad \text{and} \qquad \frac{1}{x} + \frac{3}{y} = 9$$

13. Find a quadratic polynomial, the sum and product of whose zeroes are 0 and $-\frac{4}{3}$ respectively. 3

Hence find the zeroes.

14. Find the zeroes of the quadratic polynomial $2x^2 + 5x - 3$ and verify the relationship between the zeroes and the coefficients. 3

15. A boy of height 95 cm is walking away from base of a lamp post at a speed of 1.5 m/s. If the lamp post is 3.8 m above the ground, find the length of his shadow after 5 seconds. 3

In △ABC, D is point on AB such that AD : DB = 3 : 2. If point E is on AC such that DE∥BC, then find ratio of ar (△ABC) and ar (△ADE).

3

If 2 sin A : 3 cos A = 3 : 4, then find the values of tan A, cosec A and cos A.

3

18   When is an equation called 'an identity'. Prove the trigonometric identity $1 + \tan^2 A = \sec^2 A$

3

19   In a school, IQ of 250 students of class X is given in the following frequency distribution :

3

IQ	120-130	130-140	140-150	150-160	160-170
Number of students	10	80	100	50	10

Find the mean IQ of students.

20   The following table shows marks (out of 60) of students in Social Science :

3

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of students	2	3	5	9	8	3

Find the median of the data.

SECTION-D

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

21   Show that square of any positive odd integer is of the form $8m + 1$ for some integer m.

4

22   A lending library has a fixed charge for one week, and charges fine for keeping the book for each day thereafter. Vansh had issued a book and paid ₹ 35 as he delayed it by one day due to rain on that day. Paritosh had issued a book, but paid ₹ 115 for a book as he had forgotten to return it and delayed it by five days and he returned it after getting a reminder from the concerned person. Find the fixed charge and the total amount of fine money paid by them. What behaviour does Vansh show ?

4

23   A fraction becomes $\frac{1}{2}$ when 1 is added to the numerator and it becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and 2 is added to the denominator. Find the fraction. Also find the number obtained when 5 is added to numerator and 4 is subtracted from the denominator.

4

24   Obtain all other zeroes of the polynomial $9x^4 - 6x^3 - 35x^2 + 24x - 4$, if two of its zeroes are 2 and -2.
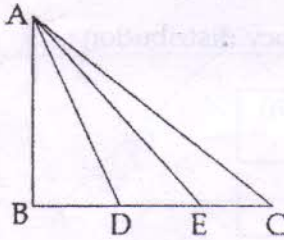
4

25   In a $\triangle ABC$, $AE \perp BC$ and AD is a median, then prove that   4

$$AB^2 + AC^2 = 2\,(AD^2 + BD^2)$$

26   In right angled $\triangle ABC$ if D and E trisect BC, then prove that $8\,AE^2 = 3\,AC^2 + 5\,AD^2$.   4

27   Prove the identify :   4

$$\frac{\tan A}{1 + \cot A} + \frac{\cot A}{1 + \tan A} = \sec A \cdot \csc A - 1$$

28   Given that $\cos(A + B) = \cos A\,\cos B - \sin A\,\sin B$ and $\sin(A + B) = \sin A\,\cos B + \cos A\,\sin B$. Find   4
the values of $\cos 75°$ and $\sin 75°$ by taking suitable values of A and B.

29   If $\tan A + \sin A = m$ and $\tan A - \sin A = n$, then prove that   4
$(m^2 - n^2)^2 = 16\,mn$.

30   Following frequency distribution shows the daily expenditure incurred on milk by 80   4
families. If mean is ₹ 44, then find the missing frequencies x and y.

Daily expenditure (in ₹)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Number of families	1	12	15	9	x	13	y	8	4

31   The ages of employees of an office are shown in the following frequency distribution :   4

Age (in years)	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Number of employees	8	11	20	25	16	12	20	10

Draw a 'less than type' ogive and a 'more than type' ogive for the above data. Also, find median from the curves.