DELHI PUBLIC SCHOOL, CHANDIGARH

Summative Assessment-I, Session 2014-15
Class : X, Subject : Maths (Set 1)

Time : 3 hours   MM : 90

General Instructions:

(i)   All questions are compulsory.
(ii)   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.
(iii)   Use of calculator is not permitted.

SECTION – A

**Question numbers 1 to 4 carry one mark each.**

1.   The LCM of two numbers is 2079 and their HCF is 27. If one of the number is 297. Find the other number.

2.   Find the quadratic polynomial whose zeros are 3 and -4 respectively.

3.   If sides of two similar triangles are in the ratio 4 : 3, then find the ratio of their areas.

4.   If mean of 5 observations x, x +2, x +4, x + 6 and x +8 is 11, then find the value of x.

5.   If α and β are zeros of $4x^2 + 3x +7$, then find the value of $\dfrac{1}{\alpha}+\dfrac{1}{\beta}$.

6.   Find k so that the following pair of linear equations has no solution.
$3x + y = 1$; $(2k-1)x + (k-1)y = 2k +1$.

7.   ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2AC^2$.

8.   Prove that : $\sqrt{\dfrac{1+\cos A}{1-\cos A}} = \cos ecA + \cot A$.

9.   If $3 \cot A = 4$, Prove that $\dfrac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A$

10.   Find the mode of the following data

Marks	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80
Frequency	7	14	13	12	20	11	15	8

11. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is any integer.

12. On a morning walk, three persons steps off together and their steps measure 40 cm, 42 cm, and 45 cm respectively. What is the minimum distance each should walk so that each can cover same distance in complete steps ?

13. Find the zeros of quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeros and the coefficients of the polynomial.

14. Solve for x and y :

$$\frac{1}{3x+y} + \frac{1}{3x-y} = \frac{3}{4}; \quad \frac{1}{2(3x+y)} - \frac{1}{2(3x-y)} = \frac{-1}{8}.$$

15. In the given figure, the line segment XY is parallel to AC of a $\triangle$ ABC and it divides the triangle into two parts of equal area. Find $\dfrac{AX}{AB}$.
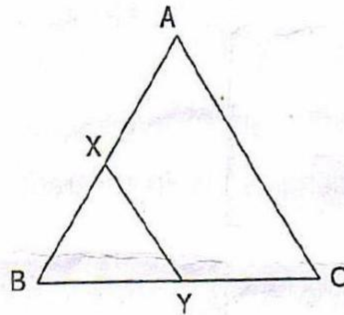
16. Sides AB, BC and median AD of a $\triangle$ ABC are respectively proportional to sides PQ, QR and median PM of $\triangle$ PQR. Show that $\triangle$ ABC $\sim$ $\triangle$ PQR

17. Prove that : $(\sin\theta + \cosec\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$.

18. Prove that:

$$\cos\theta.\sin\theta - \frac{\sin\theta\cos(90-\theta)\cos\theta}{\sec(90-\theta)} - \frac{\cos\theta\sin(90-\theta)\sin\theta}{\cosec(90-\theta)} + \cosec(90-\theta) = \frac{1}{\cos\theta}$$

19. Find the median of the following data :

Class Interval	0–10	10–20	20–30	30–40	40–50	Total
Frequency	8	16	36	34	6	100

20. The following table gives the literacy rate (in %) in 40 cities. Find the mean literacy rate.

Literacy rate (in %)	45–55	55–65	65–75	75–85	85–95
Number of cities	4	11	12	9	4

21. Prove that $2 + \sqrt{5}$ is an irrational number.

22. Solve the following pair of linear equations graphically :

$$2x + y = 4$$
$$2x - y = 4.$$

Also, find the co-ordinates of the vertices of the triangle formed by the lines with y-axis and also find the area of triangle.

23. If two zeros of the polynomial p(x)= $2x^4 + 7x^3 - 19x^2 - 14x + 30$ are $\sqrt{2}$ and $-\sqrt{2}$, find the other zeros.

24. Points A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If they travel in same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars ?

What steps do you suggest to save petrol?

25. State and prove Basic Proportionality Theorem (Thales Theorem)

26. In an equilateral triangle ABC, D is a point on BC such that $BD = \dfrac{1}{3} BC$. Prove that $9 AD^2 = 7 AB^2$.

27. (i) If $\sin A = \dfrac{3}{4}$, find cos A and tan A.

(ii) If $\sin 2A = \cos(A - 6^0)$, find the value of A.

28. If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$; prove that : $m^2 - n^2 = 4\sqrt{mn}$.

29. If the median of the distribution given below is 27. Find the value of x and y.

Class Interval	0–10	10–20	20–30	30–40	40–50	50–60	Total
Frequency	5	x	20	14	y	8	68

30. Prove that : $\dfrac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \dfrac{1}{\sec\theta - \tan\theta}$

31. Draw 'less than ogive' and 'more than ogive' on a single graph paper and hence find the median of the following data :

Class Interval	5–10	10–15	15–20	20–25	25–30	30–35	35–40
Frequency	2	12	2	4	3	4	3