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GYAN BHARATI SCHOOL

SUMMATIVE ASSESSMENT – I, 2015-16
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 In ΔABC, D and E are points on AC and BC repectively such that $DE \parallel AB$. If $AD = 2x$, $BE = 2x - 1$, $CD = x + 1$ and $CE = x - 1$, then find the value of x. 1

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

3 Find the value of $4 \cos 50°. \operatorname{cosec} 40°$. 1

4 Find the mode of the data, using an empirical formula, when it is given that median = 41.25 and mean = 33.75. 1

SECTION-B

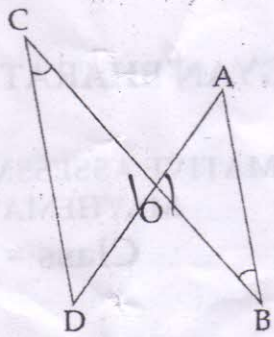
Question numbers 5 to 10 carry two marks each.

5 Explain why the number $7 \times 5 \times 3 \times 2 + 3$ is not a prime number ? 2

6 State fundamental theorem of arithmetic. Explain it for the number 1176 2

7 Find the zeroes of the quadratic polynomial $12x^2 - x - 1$ and verify the relationship between the zeroes and the coefficients. 2

8 In the figure, if $\angle B = \angle C$, prove that $\Delta OAB \sim \Delta ODC$. 2



9 Evaluate : 2

$\sin 35° \cos 55° + \cos 35° \sin 55°$

10 Find the median of the marks of 10 students in a class given below : 2

21, 26, 17, 18, 7, 14, 23, 10, 8, 13.

SECTION-C

Question numbers 11 to 20 carry three marks each.

11 Show that $3 + 7\sqrt{2}$ is an irrational number. Is sum of two irrational numbers always irrational number ? 3

12 Ten students of class X took part in Mental Mathematics Quiz. If the number of girls exceeds number of boys by 2, find the number of girls and boys who took part in the quiz. 3

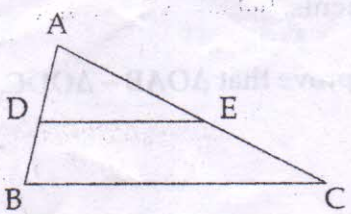
13 Check whether polynomial $x-3$, is a factor of the polynomial $x^3 - 3x^2 - x + 3$. Verify by division algorithm. 3

14 Solve by elimination : 3

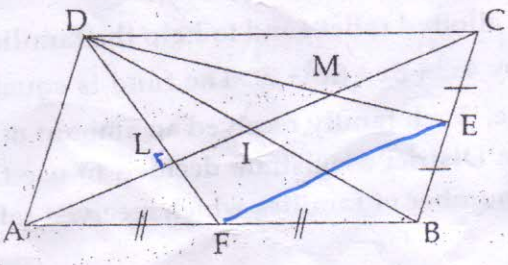
$ax + by - a + b = 0$ $ax + by = a - b$

$bx - ay - a - b = 0$

15 In given figure, DE||BC. If DE = 5 cm, BC = 8 cm and area of $\Delta ADE = 10$ cm^2, find the area of ΔABC. 3



16 In given figure, ABCD is a parallelogram F and E are the mid points of AB and BC respectively. 3



Prove that DB bisects LM.

17 If $4 \sec \theta = 5$, then evaluate : $\dfrac{\sin\theta - 2\cos\theta}{\tan\theta - \cot\theta}$ 3

18 Prove that : $(\cot\theta - \operatorname{cosec}\theta)^2 = \dfrac{1-\cos\theta}{1+\cos\theta}$ 3

19 In a class test in English, students obtained marks (out of 100) as shown in the following frequency distribution . Draw a 'less than type' ogive for the given data. 3

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of students	3	4	6	15	40	26	30	10	2	4

20 For Uttarakhand flood victims, money donated by teachers of a school is shown in the following frequency distribution : Find mean and median for this data. 3

Money donated (in ₹)	500-700	700-900	900-1100	1100-1300	1300-1500
Number of teachers	4	3	18	2	3

SECTION-D

Question numbers 21 to 31 carry four marks each.

21 The product of two numbers x and y is 217728. Find the LCM and HCF of x and y if it is given that $\text{LCM}(x, y) = 42 \times \text{HCF}(x, y)$. 4

22 For what values of a and b does the following pair of linear equations have infinite number of solutions ? $2x + 3y = 7$, $a(x+y) - b(x-y) = 3a + b - 2$ 4

23 If $x+a$ is a factor of the polynomials x^2+px+q and x^2+mx+n, prove that $a=\frac{n-q}{m-p}$ 4

24 Government of India allotted relief fund to help the families of flood affected village. The fund is represented by $4x^3+8x+8x^2+7$. The fund is equally divided between each of the families of that village. Each family received an amount of x^2-2. After distribution, some amount was left. The District Magistrate decided to use this amount to open a school in that village. Find the number of families which received relief fund from Government, and the left amount. 4

What is the importance of such relief funds ?

25 State and prove Basic Proportionality theorem. 4

26 If X and Y are the points on the sides AB and BC, XY $\parallel$ AC, in a triangle ABC, such that it divides the region into two equal parts. Find $\frac{AX}{AB}$. 4

27 If $\tan(20°-3\alpha) = \cot(5\alpha-20°)$, then find the value of α and hence evaluate : 4

$\sin\alpha.\sec\alpha.\tan\alpha - \operatorname{cosec}\alpha.\cos\alpha.\cot\alpha$

28 Prove that : $\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta} - \frac{\cos\theta-\sin\theta}{\cos\theta+\sin\theta} = \frac{4}{\cot\theta-\tan\theta} = \frac{4\tan\theta}{1-\tan^2\theta}$ 4

29 Prove that : $2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)+1=0$ 4

30 The given frequency distribution represents the number of passengers who boarded a local bus during a particular day . Find the mode and median of the given data. 4

Time (in hours)	5-8	8-11	11-14	14-17	17-20	20-23
Number of passengers	40	90	44	58	53	10

31 Following is the ages of asthmatic patients admitted during a year in a hospital. Find the mean age of the patients. 4

Age (in years)	0-8	8-16	16-24	24-32	32-40	40-48	48-56	56-64
Number of patients	6	25	12	13	11	14	11	8

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