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INDIAN
School

Om Sai Ram

SUMMATIVE ASSESSMENT – I, 2016-17

MATHEMATICS, SET-A

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 $\triangle ABC$, D and E are points on the sides AB and AC respectively such that $DE \parallel BC$. If $AE = 5.4$ cm, $EC = 3.6$ cm and $AD = 3$ cm, then find BD. 1
2. If $\operatorname{cosec} A = \frac{7}{5}$, then find the value of $\sec(90^\circ - A)$. 1
3. Write the expression in simplest form : $\sec^2\theta - \frac{1}{\operatorname{cosec}^2\theta - 1}$. 1
4. Find mode, using an empirical relation, when it is given that mean and median are 10.5 and 9.6 respectively. 1

SECTION-B

Question numbers 5 to 10 carry two marks each.

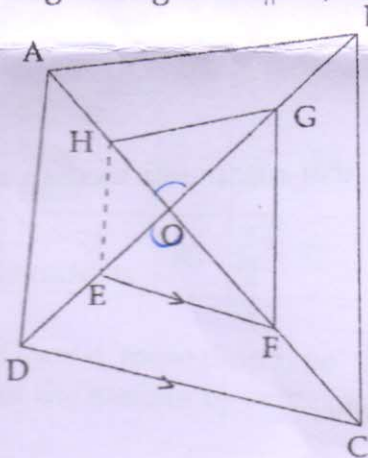
5. Explain why $(17 \times 5 \times 11 \times 3 \times 2 + 2 \times 11)$ is a composite number. 2
6. Prove that $\frac{3\sqrt{2}}{4}$ is an irrational number. 2
7. Find whether the lines representing the following pair of linear equation intersect at a point, are parallel or coincident :
 $\frac{3x}{2} - \frac{5y}{3} = -2$, $\frac{x}{3} + \frac{y}{2} = \frac{13}{6}$ 2
8. In equilateral $\triangle ABC$, point E lies on CA such that $BE \perp CA$. Find $AB^2 + BC^2 + CA^2$ in terms of BE^2 . 2

- 9 Express the trigonometric ratio of $\sec A$ and $\tan A$ in terms of $\sin A$ 2
- 10 The mean and median of 100 observations are 50 and 52 respectively. The value of the largest observation is 100. It was later found that it is 110 not 100. Find the true mean and median. 2

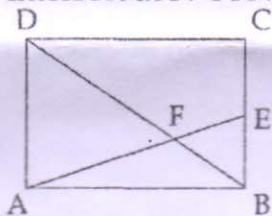
SECTION-C

Question numbers 11 to 20 carry three marks each.

- 11 Three alarm clocks ring at intervals of 4, 12 and 20 minutes respectively. If they start ringing together, after how much time will they next ring together? 3
- 12 What should be added to the polynomial $x^2 - 5x + 4$, so that 3 is the zero of the polynomial? 3
- 13 If $x^3 + 8x^2 + kx + 18$ is completely divisible by $x^2 + 6x + 9$, then find the value of k . 3
- 14 Two chairs and three tables cost ₹ 5650 whereas three chairs and two tables cost ₹ 7100. Find the cost of a chair and a table separately. 3
- 15 In given figure $EF \parallel DC$, $FG \parallel CB$ and $GH \parallel BA$, prove that $HE \parallel AD$. 3



- 16 In the figure, ABCD is a rectangle and E is the middle point of BC. DB and AE intersect at F. Prove that $DF = 2FB$ and $AF = 2FE$. 3



- 17 Evaluate: $\tan 1^\circ \cdot \tan 2^\circ \cdot \tan 3^\circ \dots \tan 89^\circ$ 3

18 Prove that : 3

$$\sqrt{\frac{\operatorname{cosec} A + 1}{\operatorname{cosec} A - 1}} + \sqrt{\frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}} = 2 \sec A$$

19 The following table gives the ages of 1000 persons who visited a shopping centre on Sunday :

Age (in years)	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of persons	105	222	220	138	102	113	100

3

Using step deviation method, find the mean number of the people who visited the shopping centre on Sunday.

20 An N.G.O. working for welfare of cancer patients, maintained its records as follows :

Age of patients (in years)	0-20	20-40	40-60	60-80
Number of patients	35	315	120	50

3

Find the mode.

SECTION-D

Question numbers 21 to 31 carry four marks each.

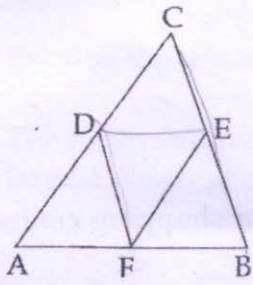
21 A rectangular courtyard is 18 m 72 cm long and 13 m 20 cm broad. It is to be paved with square tiles of the same size. Find the least possible number of such tiles. 4

22 Find all the zeroes of the polynomial $2x^4 - 9x^3 + 5x^2 + 3x - 1$, if two of its zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$. 4

23 Solve graphically the pair of linear equations :
 $3x - 4y + 3 = 0$ and $3x + 4y - 21 = 0$ 4
Find the coordinate of the vertices of triangular region formed by these lines and x -axis. Also calculate the area of this triangle.

24 Three lines $x + 3y = 6$, $2x - 3y = 12$ and $x = 0$ are enclosing a beautiful triangular park. Find the points of intersection of the lines graphically and the area of the park, if all measurements are in km. What type of behavior should be expected by public in these type of parks ? 4

25 In the figure, $DF \parallel BC$ and $\frac{AD}{DC} = \frac{CE}{BE}$. Prove that FDCE is a parallelogram. 4



26 In a ΔABC , the middle points of sides BC, CA and AB are D, E and F respectively. Find ratio of ar (ΔDEF) to ar (ΔABC). 4

27 If $\cos(A+B)=0$ and $\cot(A-B)=\sqrt{3}$, then evaluate :

(i) $\cos A \cdot \cos B - \sin A \cdot \sin B$ 4

(ii) $\frac{\cot B - \cot A}{\cot A \cdot \cot B + 1}$

28 If $m = \cos A - \sin A$ and $n = \cos A + \sin A$, show that 4

$$\frac{m^2 + n^2}{m^2 - n^2} = -\frac{1}{2} \sec A \cdot \operatorname{cosec} A = -\frac{(\cot A + \tan A)}{2}$$

29 Prove that :

$$\left(\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} \right) \cdot \left(\frac{\cos A}{1 - \sin A} - \frac{1 - \sin A}{\cos A} \right) = 4 \tan A \cdot \sec A$$
 4

30 Following table shows marks (out of 100) of students in a class test :

Marks More than	0	10	20	30	40	50	60	70	80	90	100
No. of students	80	77	72	65	55	43	28	16	10	8	0

Draw a 'more than type' ogive. From the curve, find the median. Also, check the value of the median by actual calculations.

31 Some students of Class X donated for the welfare of old age persons. Their contributions are shown in the following frequency distribution :

Amount (in ₹)	0-20	20-40	40-60	60-80	80-100
Number of students	5	8	12	11	4

Find median and mode for their contribution. 4

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