

## SUMMATIVE ASSESSMENT - I, 2015-16

## MATHEMATICS (SET-1)

Class - X

Time Allowed: 3 hours

Maximum Marks: 90

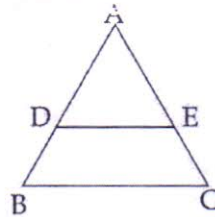
## General Instructions:

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 the given figure, if  $DE \parallel BC$ ,  $AE = 8$  cm,  $EC = 2$  cm and  $BC = 6$  cm, then find  $DE$ .



- ✓ 2. If  $\operatorname{cosec} \theta = \frac{5}{4}$ , find the value of  $\cot \theta$ .
- ✓ 3. Find the value of  $6 \tan^2 A - 6 \sec^2 A$ .

4. Following distribution gives cumulative frequencies of 'more than type' :

Marks obtained	More than or equal to 5	More than or equal to 10	More than or equal to 15	More than or equal to 20
Number of students (cumulative frequency)	30	23	8	2

Change the above data to a continuous grouped frequency distribution.

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## SECTION-B

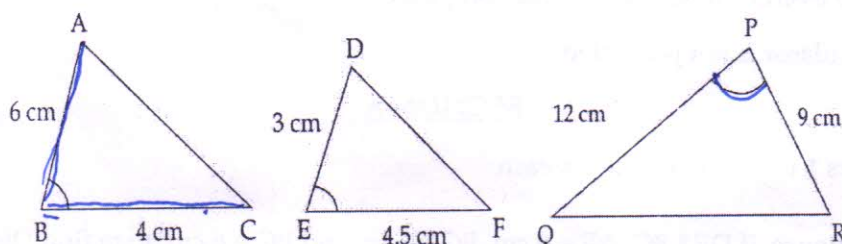
Question numbers 5 to 10 carry two marks each.

5. HCF and LCM of two numbers is 9 and 108 respectively. If one of the numbers is 36, find the other number.
6. Find the largest number which divides 70 and 125 leaving remainder 5 and 8 respectively.
7. Find whether the following pair of linear equations is consistent or inconsistent :

$$3x - 2y = 5$$

$$2x + 3y = 8$$

8. State which of the two triangles given in the figure are similar. Also state the similarity criterion used.



9. Prove that:  $\frac{\sqrt{1 - \sin^2 A}}{\sin A} = \cot A$ .

10. Calculate the mode of the following data :

Class interval	100-200	200 - 300	300 - 400	400 - 500	500 - 600	600 - 700
Frequency	18	15	23	55	87	29

## SECTION-C

11. Two tankers contain 620 litres and 840 litres of diesel respectively. Find the maximum capacity of a container which can measure the diesel of both the tankers in exact number of times.
12. Solve for x and y:

$$\frac{2}{x-1} - \frac{1}{y-1} = 4$$

$$\frac{4}{x-1} - \frac{1}{y-1} = 10$$

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

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14. Determine graphically whether the following pair of linear equations

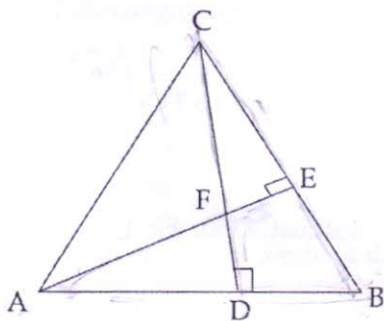
$$2x - 3y = 5$$

$$3x + 4y = -1$$

has

- (i) a unique solution,
- (ii) infinitely many solutions or
- (iii) no solution

15. In given figure, altitudes AE and CD intersect at F.



Prove that

- (i)  $\triangle ADF \sim \triangle CEF$
- (ii)  $AD \cdot EF = DF \cdot CE$ .

16. If in a right angled  $\triangle ABC$ , right angled at A,  $AD \perp BC$ , then prove that

$$AB^2 + CD^2 = BD^2 + AC^2.$$

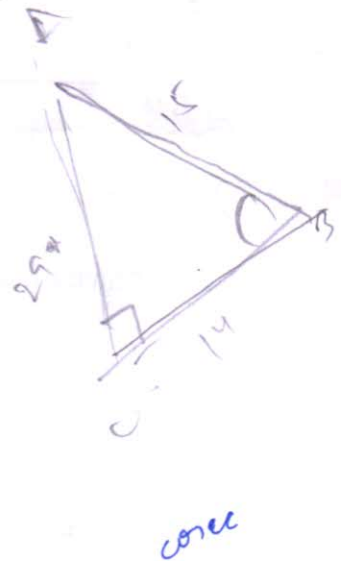
17. In  $\triangle ABC$  right angled at C, If  $15 \sin A = 12$ , then find the value of  $\cos B$ ,  $\sec B$ ,  $\operatorname{cosec} B$ ,  $\tan B$ .

18. If  $\frac{\cos \alpha}{\cos \beta} = m$  &  $\frac{\cos \alpha}{\sin \beta} = n$ , then show that  $(m^2 + n^2) \cos^2 \beta = n^2$ .

19. The weekly expenditure of 500 families is tabulated below

Weekly Expenditure (in ₹)	Number of families
0-1000	150
1000-2000	200
2000-3000	75
3000-4000	60
4000-5000	15

Find the median expenditure.





20. Find the unknown entries a, b, c, d, e and f in the following distribution of heights of students in a class :

Weights(in kg)	Frequency	Less than type c. f.
35 - 40	7	a
40 - 45	d	21
45 - 50	15	b
50 - 55	e	58
55 - 60	23	c
60 - 65	19	100
Total	f	

### SECTION-D

21. Can the number  $6^n$ , n being a natural number, end with the digit 5? Give reasons.

22. 4 chairs and 3 tables cost ₹2100 and 5 chairs and 2 tables cost ₹1750. Find the cost of one chair and one table separately.

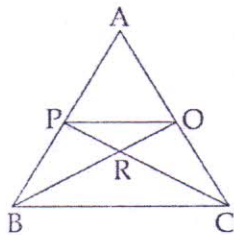
23. Obtain all other zeroes of the polynomial  $x^4 - 5x^3 + 6x^2 + 2x - 4$ , if two of its zeroes are  $1 + \sqrt{3}$  &  $1 - \sqrt{3}$ .

24. Rahul donated some money and books to a school for poor children. Money and books can be represented by the zeroes (i.e.  $\alpha, \beta$ ) of the polynomial  $p(x) = x^2 - x - 2$ . Akash who is friend of Rahul, also got inspired by him and donated the money and books in the form of a polynomial whose zeroes are  $1 + 2\alpha$  and  $1 + 2\beta$ . Find the polynomial represented by Akash's donation?

Why Akash got inspired by Rahul?

25. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

26. In the given figure,  $\Delta ABC$ ,  $PQ \parallel BC$  and  $BC = 3 PQ$ . Find the ratio of the area of PRQ and area CRB where PC and BQ intersect at R.



Contd(4)

27. Without using trigonometric table, evaluate :

$$\frac{\cos^2 35^\circ + \sin^2 55^\circ}{\operatorname{cosec}^2 15^\circ - \tan^2 75^\circ} + \sqrt{3}(\tan 13^\circ \cdot \tan 23^\circ \cdot \tan 30^\circ \cdot \tan 67^\circ \cdot \tan 77^\circ)$$

28. Prove that :

$$(\sin\theta + \cos\theta + 1) \cdot (\sin\theta - 1 + \cos\theta) \cdot \sec\theta \cdot \operatorname{Cosec}\theta = 2$$

29. Prove the following identity:

$$\frac{\tan\theta}{\sec\theta + 1} + \frac{\cot\theta}{\operatorname{cosec}\theta + 1} = \operatorname{cosec}\theta \times \sec\theta - \sec\theta \cdot \tan\theta$$

30. On the Sports day of a school, 300 students participated. Their ages are given in the following distribution :

Age (in years)	5-7	7-9	9-11	11-13	13-15	15-17	17-19
Number of students	67	33	41	95	36	13	15

Find the mean and mode of the data.

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

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.

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