SUMMATIVE ASSESSMENT – I, 2016-17
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 $\triangle ABC$, D and E are points on the sides AB and AC respectively such that DE $\|$ BC. If AE = 2 cm, AD = 3 cm and BD = 4.5 cm, then find CE.   1

2. If $\cos(40° + x) = \sin 30°$, find the value of x.   1

3. If $\sin\theta = \sqrt{3}\ \cos\theta$ find the value of $\dfrac{\tan\theta - 1}{\tan\theta + 1}$.   1

4. If the intersection of less than ogive and more than ogive curves is (45.5, 47.5) then find the median.   1

SECTION-B

Question numbers 5 to 10 carry two marks each.

5. Show that every odd positive integer is of the form $2q + 1$ and that every even positive integer is of the form $2q$, where q is some integer.   2

6. Prove that $2\sqrt{2}$ is an irrational number.   2

7. Given the linear equation $3x - 4y - 7 = 0$, write another linear equation in these two variables such that the geometrical representation of the pair so formed is :   2
   (i)   intersecting lines   (ii)   parallel lines

8. D is a point on the side BC of a triangle ABC sudh that $\angle ADC = \angle BAC$ show that $CA^2 = CB.CD$.   2

9. In a right angled $\triangle UVW$ right angled at W, if sin U = sin V, then show that $\angle U = \angle V$.   2

10. The following table gives the literacy rate (in %) of 25 cities. Find the median class and modal class.   2

| Literacy rate (in percent)	50 - 60	60 - 70	70 - 80	80 - 90
Number of cities	9	6	8	2

SECTION-C

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

11. Find the HCF of 96 and 404 by the prime factorization method. Hence, find their LCM.   3

12. What should be added in the polynomial $x^3 - 2x^2 - 3x - 4$ so that it is completely divisible by $x^2 - x$.   3

13. Find a quadratic polynomial, the sum and product of whose zeroes are -10 and 25 respectively. Hence find the zeroes.   3
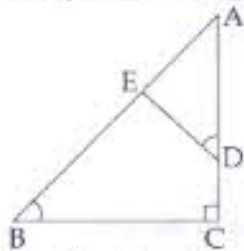
14. Solve for x and y :   3

    $$\frac{x}{2} + \frac{2y}{3} = -1$$

    $$x - \frac{y}{3} = 3$$

15. In the figure DE∥OQ and DF∥OR. Show that EF∥QR.   3
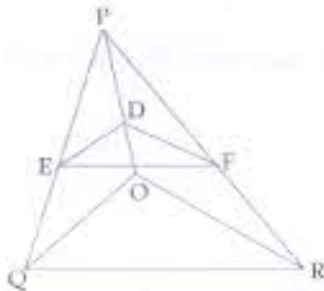
16. In $\triangle ABC$, if $\angle ADE = \angle B$, then prove that $\triangle ADE \sim \triangle ABC$.   3
    Also, if AD = 7.6 cm, AE = 7.2 cm, BE = 4.2 cm and BC = 8.4 cm, then find DE.

17. Find the value of :   3

    $$\frac{\cosec^2 67° - \tan^2 23°}{\sin^2 17° + \sin^2 73°} + \frac{\sin 59°}{\cos 31°}$$

18. Prove the identity : $\dfrac{1 - \tan A.\sin A.\cos A}{\sin^2 A} + 1 = \dfrac{1}{\sin^2 A}$ 3

19. Find the arithmetic mean of the following data by using step deviation method :   3

Height (in inches)	Frequency
Less than 62.5	5
Less than 65.5	23
Less than 68.5	65
Less than 71.5	92
Less than 74.5	100

20 Find the mode of the following frequency distribution of marks obtained by 50 students :   3

Marks obtained	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Number of students	5	12	20	10	3

SECTION-D

Question numbers 21 to 31 carry four marks each.

21 If 0.3528 is expressed in the form $\dfrac{P}{2^m 5^n}$, find the smallest value of n, m and p.   4

22 If a polynomial $x^4 - 3x^3 - 8x^2 + 12x + 16$ has two zeroes as -1 and 4, then find the other   4
zeroes.

23 Solve graphically the pair of linear equations :   4
$5x - y = 5$ and $3x - 2y = -4$
Also write the coordinates of the point of intersection of these lines with
$y-$axis. Hence shade the region enclosed by these lines and $y-$axis.

24 The ratio of incomes of two persons A and B is 9 : 7 and the ratio of their expenditures is 4 : 3.   4
If their savings are ₹ 200 per month, find their monthly incomes.
Why is it necessary to save money ?

25 Diagonals of a trapezium ABCD with AB | BC intersect each other at the point O. If AB = 2CD,   4
find the ratio of the areas of $\triangle AOB$ and COD.

26 "In a right triangle, the square of the hypotenuse is equal to the sum of the squares of other   4
two sides." Prove it.

27 If 3 tanA = 4 check whether $\dfrac{1 - \tan^2 A}{1 + \tan^2 A} = \cos^2 A - \sin^2 A$ or not.   4

28 If $\tan(A + B) = \sqrt{3}$ and $\tan(A-B) = \dfrac{1}{\sqrt{3}}, 0° \angle A + B \leq 90°, A > B$, find A and B.   4
f tanA + sinA = m and tanA − sinA = n, then prove that
$(m^2 - n^2)^2 = 16\, mn$.

29 Prove the identity: 4

$(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \dfrac{1}{\tan A + \cot A}$

30 Weekly pocket expenses of 100 girls of Class X of a school are given in the following table :   4

Pocket money (in ₹)	more than or equal to 30	more than or equal to 60	more than or equal to 90	more than or equal to 120	more than or equal to 150	more than or equal to 180	more than or equal to 210	more than or equal to 240
Number of girls	100	90	75	55	25	10	4	1

Draw a 'more than type' ogive and from the curve, find the median.

31 Cost of Living Index for some period is given in the following frequency distribution : 4

Index	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000	2000-2100	2100-2200
Number of weeks	3	11	12	7	9	8	2

Find the mode and median for above data.

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