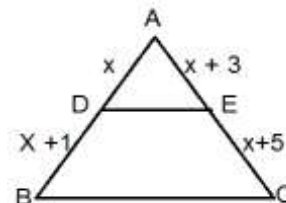**SUMMATIVE ASSESSMENT - I, 2016 -17 MATHEMATICS - Class - X Question paper – 2** [Code: T52WVZA]

Time Allowed: 3 hours   Maximum Marks: 90

SECTION – A

1. In $\triangle ABC$, DE II BC, find the value of x.

2. In a triangle ABC, write $\sin \frac{A + B}{2}$ in terms of angle C.

3. If $(1 + \cos A) (1 - \cos A) = 3/4$,find the value of sec A.

4. In a frequency distribution, if a = assumed mean = 55, f_1 =100, h = 10 and

$\sum f_i u_i = -30$, then find the mean of the distribution.

SECTION – B

5. Use Euclid's division algorithm to find HCF of 65 and 175.

6. Explain why the number 7 x 5 x 3 x 2 + 3 is not a prime number?

7. Solve the following pair of linear equations: 9x + 8y = 42; 3x — 2y = 0

8. Show that n^2 leaves the remainder 1 when divided by 8, where n is an odd positive integer.

9. Prove that : $(1 + \tan^2 A) /(1 + \cot^2 A) = \tan^2 A$

10 - Given below is a frequency distribution table showing daily into e of 50 workers of a factory:

Daily income of Workers	200-250	250-300	300-350	350-400	400-450
Number of workers	6	10	12	08	14

 Change this table to a 'less than type' cumulative frequency table.

SECTION – C

11. Show that square of any positive integer is either of the form 3m or 3m+1 for some integer m.

12. A man has certain notes of denomination Rs. 20 and Rs. 5 which amount to Rs. 380. If the numbers of notes of each kind are interchanged, they amount to 60 less than before. Find the number of notes of each denomination.

13. By division method check whether the polynomial x^2 - 2x is a factor of the polynomial $x^3 - 5x^2 + 6x$. Verify by division algorithm.

14. Solve for x and y : 3x + 4y =13; 2x — 3y =3

15 ABC is an isosceles triangle in which AB= AC and $BC^2 = 2AB^2$. Prove that ABC is a right triangle.

16. If in $\triangle ABC \sim \triangle PQR$, BC = 18.2 cm, QR = 6.5 cm and perimeter of $\triangle$ ABC =140 cm, then find the perimeter of $\triangle PQR$.

17. If 2 sin A : 3 cos A = 3 : 4, then find the values of tan A. cosec A and cos A.

18. Prove the identity : $\dfrac{1}{cosec\ \theta + cot\ \theta} - \dfrac{1}{\sin \theta} = \dfrac{1}{\sin \theta} - \dfrac{1}{cosec\ \theta - cot\ \theta}$

 19 If the mean of the following distribution is 54, find the missing frequency x :

Class	0-20	20-40	40-60	60-80	80-100
Frequency	16	14	24	26	X

20. The amount of rainfall for 60 days is given in the following table. Find the median rainfall.

Rainfall (in cm)	0-10	10 - 20	20 -30	30 - 40	40 -- 50	50 - 60
Number of days	20	8	7	15	6	4

SECTION - D

21. State Fundamental theorem of arithmetic. Is it possible that HCF and LCM of two numbers be 24 and 540 respectively? Justify your answer.

22. Determine the value of k for which the following system of linear equations has infinite number of solutions:
(k - 3) x + 3y =k, kx +ky = 12

23. If one zero of the quadratic polynomial f (x) = $4x^2 – 8kx- + 8x - 9$ is negative of the other, then find the zeroes of $kx^2 + 3kx + 2$.

24. ANGO decided to distribute books and pencils to the students of a school running by some 4 other NGO. For this they collected some amount from different number of people. The total amount collected is represented by $4x^4 + 2x^3 - 8x^2 + 3x - 7$. The amount is equally divided between each of the students. The number of students, who received the amount is represented by x - 2+ $2x^2$, After distribution, 5x -11, amount is left with the NGO which they donated to school for their infrastructure. Find the amount received by each student from the NCO. What value have been depicted here?

25. Prove that if a line is drawn parallel to one side of triangle to intersect the other two sides in distinct points the other two sides are divided in the same ratio.

26. Vertical angles of two isosceles triangles are equal. If their areas are in the ratio 16 : 25, then 4 find the ratio of their altitudes drawn from vertex to the opposite side.

27. if sin(A+ B) = 1 and tan(A — B) = $1/\sqrt{3}$, find the value of :   (i) Tan A + Cot B (ii) sec A — cosec B.

28 - If tan A + sin A = m and tan A- sin A = n, then prove that $(m^2 - n^2)^2$ = 16 mn.

29. Prove that : $(1 + cot^2\theta).(1 +cos\theta)(1 — cos\theta)= (1 +tan^2\theta).(1 + sin\theta)(1 — sin\theta) =1$

30. The following table gives the daily income of 50 workers of a factory. Draw both types ("less than type" and "greater than type") gives

Daily income (in f)	100 —120	120 —140	140 —160	160 —180	180 —200
Number of workers	12	14	8	6	10

31. Find the mode of the following frequency distribution

Class interval	25 - 35	35 - 45	45 - 55	55 - 65	65 - 75	75 - 85
Frequency (f)	07	31	33	17	11	01