Name ___DANISH THAPAR___ Class & Section __X-G__ Roll No. __9__

SUMMATIVE ASSESSMENT – I (2015-2016)
Class–X
Subject–Maths

Time Allowed : 3 Hrs.   M.M. : 90

Please check the total marks

Do not write any answer on the question paper.

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 $\triangle DEW$, $AB \parallel EW$. If $AD = 4$ cm, $DE = 12$ cm and $DW = 24$ cm, then find the value of DB.   1

2. Evaluate : $\cos\theta \cdot \mathrm{cosec}\,(90° - \theta)$ 1

3. What happens to value of $\sin\theta$ when θ increases from $0°$ to $90°$?   1

4. From the following frequency distribution, find the median class :   1

Cost of living index	1400-1550	1550-1700	1700-1850	1850-2000
Number of weeks	8	15	21	8

SECTION-B

Question numbers 5 to 10 carry two marks each.

5. Prove that $5 - \sqrt{2}$ is an irrational number   2

6. How many irrational numbers lie between $\sqrt{2}$ and $\sqrt{3}$? Write any two of them.   2

7 Solve the following pair of linear equations :   2

$5x + 4y = 9$

$x + 2y = 3$

8 If D and E are points on the sides AB and AC of $\triangle ABC$ such that   2
AD = 6 cm, BD = 9 cm, AE = 8 cm, EC = 12 cm, Prove that DE∥BC.

9 Prove the following identity :   2

$$\frac{\cot x}{\cosec x + 1} = \frac{\cosec x - 1}{\cot x}$$

10 Find the mean of the following distribution :   2

Class interval	0-6	6-12	12-18	18-24	24-30
Frequency	5	4	1	6	4

SECTION-C

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

11 The length, breadth and height of a room are 8 m 50 cm, 6 m 25 cm and 4 m 75 cm   3
respectively. Find the length of the longest rod that can measure the dimensions of the room
exactly.

12 $3x - 9y - 12 = 0$ is given. Write another linear equation, so that the lines represented by the pair   3
are:

(i) intersecting

(ii) coincident

(iii) parallel

13 If two zeroes of a polynomial $x^3 + 5x^2 + 7x + 3$ are -1 and -3, then find the third zero.   3

14 Find the two numbers whose sum is 75 and difference is 15.   3

15 In $\triangle ABC$, D is a point on side BC such that $\angle ADC = \angle BAC$. Prove that $CA^2 = CB.CD$.   3

16 In a right angled $\triangle ABC$, $\angle B = 90°$. If $\frac{BC}{AB} = \frac{1}{\sqrt{3}}$, then find $\frac{AB}{AC}$.   3

17 If $b \cos\theta = a$, then prove that $\cosec\theta + \cot\theta = \sqrt{\dfrac{b+a}{b-a}}$.   3

18. Prove that :

$$\frac{1 + \sin \theta}{1 - \sin \theta} = (\sec \theta + \tan \theta)^2$$

19. Following is the age distribution of cardiac patients admitted during a month in a hospital. 3
Find the missing frequency, if the mode is given to be 58.

Age (in years)	20-30	30-40	40-50	50-60	60-70	70-80
Number of patients	5	13	x	20	18	19

20. The following data gives the information on the observed life times (in hours) of 150 electrical 3
components :

Life time (in hours)	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Frequency	15	10	35	50	40

Find the mode of the distribution.

SECTION-D

Question numbers **21** to **31** carry four marks each.

21. Write the HCF and LCM of the smallest odd composite number and the smallest odd prime 4
number. If an odd no. p divides q^2 then will it divide q^3 also ? Explain.

22. Solve following pair of linear equations in x and y. 4

$(a + b) x + (a - b) y = a^2 + 2ab + b^2$

$(a - b) (x + y) = a^2 + b^2$

If their point of intersection lies on the line given by $y = mx - a$, find the value of m.

23. If a polynomial $x^4 - 3x^3 - 6x^2 + kx - 16$ is exactly divisible by $x^2 - 3x + 2$, then find the value of 4
k.

24. Rahul donated some money and books to a school for poor children. Money and books can be 4
represented by the zeroes (i.e. α, β) 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
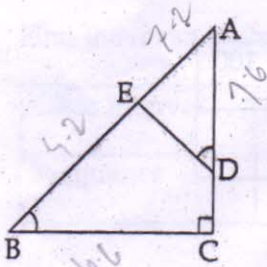donation ?

Why Akash got inspired by Rahul ?

25   In given figure, of ΔABC, D, E and F are points on AB, BC and AC respectively, such that   4
      ADEF is a parallelogram, then prove that $\dfrac{CF}{FA} = \dfrac{AD}{BD}$.
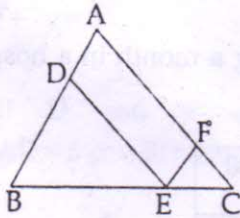
26   In ΔABC, if ∠ADE = ∠B, then prove that ΔADE ~ ΔABC.   4

      Also, if AD = 7.6 cm, AE = 7.2 cm, BE = 4.2 cm and BC = 8.4 cm, then find DE.

27   If tan (A + B) = $\sqrt{3}$ and tan (A − B) = $\dfrac{1}{\sqrt{3}}$, where 0 < A + B < 90°, A > B, find A and B. Also   4

      calculate tan A.sin (A + B) + cos A.tan(A − B)

28    $\dfrac{\tan A}{1 - \cot A} + \dfrac{\tan (90° - A)}{1 - \tan A} = 1 + \sec A \, \csc A$ 4

      Prove that :

      $\dfrac{\tan A}{1 - \cot A} + \dfrac{\tan (90° - A)}{1 - \tan A} = 1 + \sec A \, \csc A$

29   (i)   If sec θ − tan θ = x, show that :   4

             $\sec\theta = \dfrac{1}{2}\left[x + \dfrac{1}{x}\right]$ and $\tan\theta = \dfrac{1}{2}\left(\dfrac{1}{x} - x\right)$

      (ii)   If sec θ + tan θ = x, then show that :

             $\sec\theta = \dfrac{1}{2}\left[x + \dfrac{1}{x}\right]$ and $\tan\theta = \dfrac{1}{2}\left(x - \dfrac{1}{x}\right)$

30. Monthly expenditures of milk in 100 families of a housing society are given in the following   4
frequency distribution :

Monthly expenditure (in ₹)	0-175	175-350	350-525	525-700	700-875	875-1050	1050-1225
Number of families	10	14	15	21	28	7	5

Find the mode and median for this distribution.

31. The following distribution gives the weights of 60 students of a class. Find the mean and   4
mode weights of the students.

Weight (in kg)	40-44	44-48	48-52	52-56	56-60	60-64	64-68	68-72
Number of students	4	6	10	14	10	8	6	2