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CBSE Sample Paper -02
SUMMATIVE ASSESSMENT -I
Class - X Mathematics

Time allowed: 3 hours

Maximum Marks: 90

General Instructions:

- All questions are compulsory.
- The question paper comprises of 31 questions divided into four sections A, B, C and D. You are to attempt all the four sections.
- Questions 1 to 4 in section A are one mark questions.
- Questions 5 to 10 in section B are two marks questions.
- Questions 11 to 20 in section C are three marks questions.
- Questions 21 to 31 in section D are four marks questions.
- There is no overall choice in the question paper. Use of calculators is not permitted.

SECTION - A

- Determine whether the triangle having sides 6 cm, 8 cm and 10 cm is a right triangle or not.
- Express $0.\overline{6}$ as rational number in simplest form.
- Prove that $\cot^2 \theta - \frac{1}{\sin^2 \theta} = -1$
- Evaluate $\frac{\sin 18^\circ}{\cos 72^\circ}$.

SECTION - B

- Express $\sin 81^\circ + \tan 81^\circ$ in terms of trigonometric ratios of angles between 0° and 45° .
- Find the HCF of 96 and 404 by prime factorisation method. Hence, find their LCM.
- If $\tan^2 \theta = 1 - a^2$, prove that $\sec \theta + \tan^3 \theta \operatorname{cosec} \theta = (2 - a^2)^{3/2}$.
- Sum of two numbers is 35 and their difference is 13. Find the numbers.
- The number of students absent in a school was recorded every day for 147 days and the raw data was presented in the form of the following frequency table.

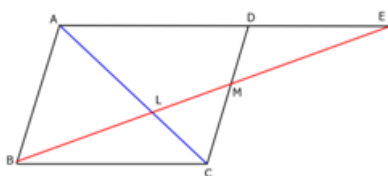
No. of students absent	5	6	7	8	9	10	11	12	13	15	18	20
No. of days	1	5	11	14	16	13	10	70	4	1	1	1

Obtain the median and describe what information it conveys.

- A man goes 10 m due east and then 24 m due north. Find the distance from the starting point.

SECTION - C

11. Show that there is no positive integer n for which $\sqrt{n-1} + \sqrt{n+1}$ is rational.
12. ABC is a right triangle right angled at C and $AC = \sqrt{3} BC$. Prove that $\angle ABC = 60^\circ$.
13. The taxi charges in a city comprise of a fixed charge together with the charge for the distance covered. For a journey of 10 km, the charge paid is Rs 75 and for a journey of 15 km, the charge paid is Rs 110. What will a person have to pay for travelling a distance of 25 km?
14. If $a \sec \theta + b \tan \theta + c = 0$ and $p \sec \theta + q \tan \theta + r = 0$, prove that
 $(br - qc)^2 - (pc - ar)^2 = (aq - bp)^2$
15. Through the mid-point M of the side CD of a parallelogram ABCD, the line BM is drawn intersecting AC in L and AD produced in E. Prove that $EL = 2BL$.



16. Find the zeros of the polynomial $f(u) = 4u^2 + 8u$ and verify the relationship between the zeros and its coefficients.
17. If $\sin \theta = \frac{a^2 - b^2}{a^2 + b^2}$, find the values of other five trigonometric ratios.
18. The following table gives weekly wages of workers in a certain organization. The frequency of class 49-52 is missing. It is known that the mean of the frequency distribution is 47.2. Find the missing frequency.

Weekly wages (Rs)	40-43	43-46	46-49	49-52	52-55
Number of workers	31	58	60	?	27

19. Solve: $ax + by = c$

$$bx + ay = 1 + c$$

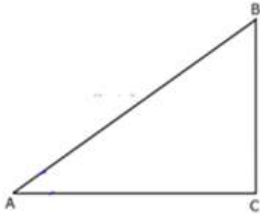
20. Without using trigonometric tables, evaluate

$$\frac{2}{3} \operatorname{cosec}^2 58^\circ - \frac{2}{3} \cot 58^\circ \tan 32^\circ - \frac{5}{3} \tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ$$

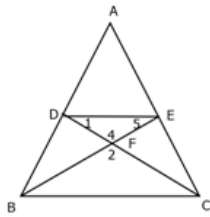
SECTION - D

21. Let a, b, c and p be rational numbers such that p is not a perfect cube. If $a + bp^{\frac{1}{3}} + cp^{\frac{2}{3}} = 0$, then prove that $a = b = c = 0$.

22. In a ΔABC , right angled at C, if $\tan A = \frac{1}{\sqrt{3}}$, find the value of $\sin A \cos B + \cos A \sin B$.



23. In the given figure, $DE \parallel BC$ and $AD : DB = 5 : 4$. Find $\frac{\text{Area}(\Delta DEF)}{\text{Area}(\Delta CFB)}$.



24. Find the mean marks of students from the following cumulative frequency distribution:

Marks	Number of students	Marks	Number of students
0 and above	80	60 and above	28
10 and above	77	70 and above	16
20 and above	72	80 and above	10
30 and above	65	90 and above	8
40 and above	55	100 and above	0
50 and above	43		

25. If $\operatorname{cosec} \theta - \sin \theta = l$ and $\sec \theta - \cos \theta = m$, prove that $l^2 m^2 (l^2 + m^2 + 3) = 1$.
26. Find the values of a and b so that $x^4 + x^3 + 8x^2 + ax + b$ is divisible by $x^2 + 1$.
27. Draw the graphs of the following equations on the same graph paper.

$$2x + y = 2; \quad 2x + y = 6$$

Find the coordinates of the vertices of the trapezium formed by these lines. Also, find the area of the trapezium formed.

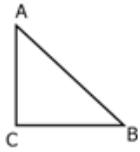
28. Prove that if in two triangles, one pair of corresponding sides are proportional and the included angles are equal, then the two triangles are similar.

29. In a ΔABC , right angled at C and $\angle A = \angle B$,

(i) Is $\cos A = \cos B$?

(ii) Is $\tan A = \tan B$?

What about other trigonometric ratios for $\angle A$ and $\angle B$. Will they be equal?



30. A sweet seller has 420 kajuburfis and 130 badamburfis. She wants to stack them in such a way that each stack has the same number and they take up the least area of the tray. What is the number of burfis that can be placed in each stack for this purpose?
31. Rohan's mother decided to distribute 900 bananas among patients of a hospital on her birthday. If the female patients are twice the male patients and the male patients are thrice the child patients in the hospital, each patient will get only one apple.
- Find the number of child patients, male patients and female patients in the hospital.
 - Which values are depicted by Rohan's father in the question?

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