

Mathematics

Summative Assessment - I

(Class - X)

(Set - 7)

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

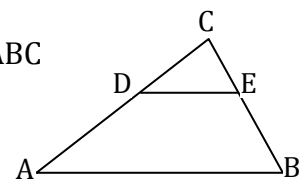
- If the product of two numbers is 1080 and their HCF is 30, find their LCM.
- For what value of k , the following pair of linear equations has infinitely many solutions?

$$10x + 5y - (k - 5) = 0$$

$$20x + 10y - k = 0$$
- If $\tan A = \frac{2}{5}$ and $A + B = 90^\circ$, then what is the value of $\cot B$?
- Find the class marks of the class 10 – 25.

SECTION – B

- If θ is an acute angle such that $\cos \theta = \frac{3}{4}$, then find $\frac{\sin \theta \tan \theta - 1}{2 \tan^2 \theta}$.
- Prove that $3\sqrt{2}$ is irrational.
- If α and β are the zeroes of the polynomial $2x^2 - 7x + 3$, then find the value of $\alpha^2 + \beta^2$.
- Sum of two natural numbers is 21 and their difference is 11, find the numbers.
- In the given figure, if $\frac{AD}{DC} = \frac{BE}{EC}$ and $\angle CDE = \angle CED$, prove that ΔABC is isosceles.
- Solve $2\cos\theta = 1$ for $0^\circ < \theta < 90^\circ$.



SECTION - C

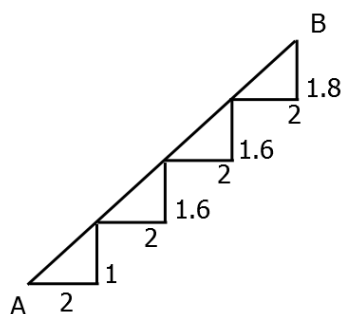
11. Solve the following system of equations by using the method of cross multiplication:
 $2x + y - 35 = 0$
 $3x + 4y - 65 = 0$
12. Two containers contain 430 and 120 litres of milk, respectively. Find the maximum capacity of a measuring vessel which can measure the milk contained in either of the containers in exact number of times.
13. The numerator of a fraction is 4 less than its denominator. If the numerator is decreased by 1 then denominator is 8 times the numerator. Find the fraction.
14. X takes 3 hours more than Y to walk 30 km. But if X doubles his pace, he is ahead of Y by $1\frac{1}{2}$ hours. Find their speed of walking.
15. In $\triangle ABC$, right-angled at B . $AB = 3$ cm and $AC = 6$ cm. Find $\angle A$ and $\angle C$.
16. Prove $(\sin^8\theta - \cos^8\theta) = (\sin^2\theta - \cos^2\theta)(1 - 2\sin^2\theta\cos^2\theta)$
17. Evaluate $\sin^2 30^\circ \cos^2 45^\circ + 4\tan^2 30^\circ + \frac{1}{2}\sin^2 90^\circ - 2\cos^2 90^\circ + \frac{1}{24}$.
18. If the mean of the following distribution is 6, find the value of p .
- | | | | | | |
|-------|---|---|---|----|---------|
| x : | 2 | 4 | 6 | 10 | $p + 5$ |
| f : | 3 | 2 | 3 | 1 | 2 |
19. Prove that the line drawn from the mid-point of one side of a triangle parallel to another side bisects the third side.
20. Determine whether the triangle having sides $(a - 1)$ cm, $2\sqrt{a}$ and $(a + 1)$ cm is a right angled triangle.

SECTION - D

21. Show that any positive odd integer is of the form $6q + 1$ or $6q + 3$ or $6q + 5$, where q is some integer.
22. What must be subtracted from $8x^4 + 14x^3 - 2x^2 + 7x - 8$ so that the resulting polynomial is exactly divisible by $4x^2 + 3x - 2$?
23. Determine graphically the vertices of a trapezium, the equations of whose sides are $x = 0$, $y = 0$, $y = 4$ and $2x + y = 6$

24. If A be the area of a right triangle and b one of the sides containing the right angle, prove that the length of the altitude on the hypotenuse is $\frac{2Ab}{\sqrt{b^4 + 4A^2}}$.

25. There is a staircase as shown in the given figure, connecting points A and B. Measurements of steps are marked in the figure. Find the straight line distance between A and B.



26. If the median of the distribution given below is 28.5, find the value of x and y .

Class:	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students:	5	x	20	15	y	5

27. If $A + B = 90^\circ$, prove that $\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}} = \tan A$.

28. If $x = \cot\theta + \tan\theta$ and $y = \sec\theta - \cos\theta$, prove that $(x^2 y)^{2/3} - (xy^2)^{2/3} = 1$.

29. Draw an ogive and the cumulative frequency polygon for the following frequency distribution by less than method.

Marks:	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of students	7	10	23	51	6	3

30. In an acute angled triangle ABC, if $\tan (A + B - C) = 1$ and $\sec (B + C - A) = 2$, find the value of A, B and C.

31. Reena and Niti went to the market. Reena purchased 20 pencils and 5 erasers for Rs 55. Niti also wanted to purchase some items but she did not have money. Reena gave some money to Niti and Niti also purchased 10 pencils and 4 erasers of the same kind for Rs 32. Represent the situation algebraically and graphically. Also tell which value of Reena is depicted in the question?