

Sample Paper-2  
Mathematics ( X )  
Summative Assesment -I

Time: 3 hours

Max. Marks 90

General Instructions

1. All questions are compulsory.
2. Draw neat labeled diagram wherever necessary to explain your answer.
3. Q.No. 1 to 11 are of objective type questions, carrying 1 mark each.
4. Q.No.12 to 20 are of short answer type questions, carrying 2 marks each.
5. Q. No. 21 to 31 carry 3 marks each. Q. No. 32 to 38 carry 4 marks each.



1.  $n^2 - 1$  is divisible by 8, if  $n$  is  
(A) an integer (B) a natural number  
(C) an odd integer (D) an even integer
2. A quadratic polynomial, whose zeroes are  $-3$  and  $4$ , is  
(A)  $x^2 - x + 12$  (B)  $x^2 + x + 12$   
(C)  $x^2 + x - 12$  (D)  $2x^2 + 2x - 24$
3. D and E are respectively the points on the sides AB and AC of a triangle ABC such that  $AD = 2$  cm,  $BD = 3$  cm,  $BC = 7.5$  cm and  $DE \parallel BC$ . Then, length of DE (in cm) is  
(A) 2.5 (B) 3  
(C) 5 (D) 6
4. The pair of equations  $x + 2y + 5 = 0$  and  $-3x - 6y + 1 = 0$  have  
(A) a unique solution (B) exactly two solutions  
(C) infinitely many solutions (D) no solution
5. If the zeroes of the quadratic polynomial  $x^2 + (a + 1)x + b$  are  $2$  and  $-3$ , then  
(A)  $a = -7, b = -1$  (B)  $a = 5, b = -1$   
(C)  $a = 2, b = -6$  (D)  $a = 0, b = -6$
6.  $\cos A = 4/5$ , then the value of  $\tan A$  is  
(A)  $3/5$  (B)  $3/4$   
(C)  $4/3$  (D)  $5/3$
7. If the HCF of  $65$  and  $117$  is expressible in the form  $65m - 117$ , then the value of  $m$  is  
(A) 4 (B) 2 (C) 1 (D) 3
8. Graphically, the pair of equations  $6x - 3y + 10 = 0$  and  $2x - y + 9 = 0$  represents two lines which are  
(A) intersecting at exactly one point. (B) intersecting at exactly two points.  
(C) coincident. (D) parallel.
9. The value of the expression  $[\operatorname{cosec} (75^\circ + \theta) - \sec (15^\circ - \theta) - \tan (55^\circ + \theta) + \cot (35^\circ - \theta)]$  is  
(A)  $-1$  (B)  $0$   
(C)  $1$  (D)  $3/2$
10. While computing mean of grouped data, we assume that the frequencies are



- (A) evenly distributed over all the classes  
(B) centred at the class marks of the classes  
(C) centred at the upper limits of the classes  
(D) centred at the lower limits of the classes
11. Construction of a cumulative frequency table is useful in determining the  
(A) mean (B) median  
(C) mode (D) all the above three measures
12. The product of two consecutive positive integers is divisible by 2". Is this statement true or false? Give reasons.
13. Justify your answer: Can the quadratic polynomial  $x^2 + kx + k$  have equal zeroes for some odd integer  $k > 1$ ?
14. Draw the graph of the pair of equations  $2x + y = 4$  and  $2x - y = 4$ . Write the vertices of the triangle formed by these lines and the  $y$ -axis. Also find the area of this triangle.
15. Prove that:  $(\operatorname{cosec} A - \cot A)^2 = \frac{1 - \cos A}{1 + \cos A}$
16. In triangles PQR and MST,  $\angle P = 55^\circ$ ,  $\angle Q = 25^\circ$ ,  $\angle M = 100^\circ$  and  $\angle S = 25^\circ$ . Is  $\triangle QPR \cong \triangle TSM$ , Why?
17. D is a point on side QR of  $\triangle PQR$  such that  $PD \perp QR$ . Will it be correct to say that  $\triangle PQD \cong \triangle RPD$ ? Why?
18. Is the following statement true? Why?  
"Two quadrilaterals are similar, if their corresponding angles are equal".
19. Is it true to say that the mean, mode and median of grouped data will always be different? Justify your answer.
20. Will the median class and modal class of grouped data always be different? Justify your answer.
21. That  $12n$  cannot end with the digit 0 or 5 for any natural number  $n$ .
22. Find the zeroes of the following polynomial by factorisation method and verify the relations between the zeroes and the coefficients of the polynomial:  $7y^2 - 11/3y - 2/3$
23. There are some students in the two examination halls A and B. To make the number of students equal in each hall, 10 students are sent from A to B. But if 20 students are sent

from B to A, the number of students in A becomes double the number of students in B. Find the number of students in the two halls.

24. On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?

25. Show that:  $\sqrt{(1 - \cos^2 \theta) \sec^2 \theta} = \tan \theta$

26. Show that:  $\frac{\tan 47^\circ}{\cot 43^\circ} = 1$

27. Find the altitude of an equilateral triangle of side 8cm.

28. In a triangle PQR, N is a point on PR such that  $QN \perp PR$ . If  $PN \cdot NR = QN^2$ , prove that  $\angle PQR = 90^\circ$

29. The following are the ages of 300 patients getting medical treatment in a hospital on a particular day :

Age In Years	10-20	20-30	30-40	40-50	50-60	60-70
Number of patients	60	42	55	70	53	20

Form:

- (i) Less than type cumulative frequency distribution.
- (ii) More than type cumulative frequency distribution.

30. Calculate the mean of the scores of 20 students in a mathematics test :

Marks	10-20	20-30	30-40	40-50	50-60
Number of Students	2	4	7	6	1

31. For which values of  $a$  and  $b$ , are the zeroes of  $q(x) = x^3 + 2x^2 + a$  also the zeroes of the polynomial  $p(x) = x^5 - x^4 - 4x^3 + 3x^2 + 3x + b$ ? Which zeroes of  $p(x)$  are not the zeroes of  $q(x)$ ?

32. In  $\Delta PQR$ ,  $PD \perp QR$  such that D lies on QR . If  $PQ = a$ ,  $PR = b$ ,  $QD = c$  and  $DR = d$ , prove that  $(a + b)(a - b) = (c + d)(c - d)$ .

33. O is the point of intersection of the diagonals AC and BD of a trapezium ABCD with  $AB \parallel DC$ . Through O, a line segment PQ is drawn parallel to AB meeting AD in P and BC in Q. Prove that  $PO = QO$ .

34. Show that  $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$



35. If  $\operatorname{cosec}\phi + \cot\phi = p$ , then show that  $\cos\phi = \frac{p^2 - 1}{p^2 + 1}$

36. Vijay had some bananas, and he divided them into two lots A and B. He sold the first lot at the rate of Rs 2 for 3 bananas and the second lot at the rate of Rs 1 per banana, and got a total of Rs 400. If he had sold the first lot at the rate of Rs 1 per banana, and the second lot at the rate of Rs 4 for 5 bananas, his total collection would have been Rs 460. Find the total number of bananas he had.

37. The distribution of heights (in cm) of 96 children is given below :

Height (in cm)	Number of children
124-128	5
128-132	8
132-136	17
136-140	24
140-144	16
144-148	12
148-152	6
152-156	4
156-160	3
160-164	1

Draw a less than type cumulative frequency curve for this data and use it to compute median height of the children.

38. Size of agricultural holdings in a survey of 200 families is given in the following table:

Size of agricultural holdings (in ha)	Number of families
0-5	10
5-10	15
10-15	30
15-20	80
20-25	40
25-30	20
30-35	5

Compute median and mode size of the holdings.

