

**Goa Board**  
**Class X Mathematics**  
**Term 1**  
**Sample Paper - 4**

**Time: 3 hours**

**Total Marks: 90**

**General Instructions:**

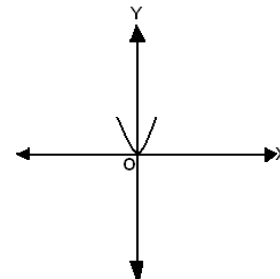
1. All questions are **compulsory**.
2. The question paper consists of **31** questions divided into **four sections: A, B, C and D**. **Section A** comprises of **4** questions of 1 mark each, **Section B** comprises of **6** questions of 2 marks each, **Section C** comprises of **10** questions of 3 marks each and **Section D** comprises of **10** questions of 4 marks each.
3. Question numbers **1 to 4** in **Section A** are multiple choice questions where you are to select **one** correct option out of the given four.
4. Use of calculator is **not** permitted.

**Section A**

(Questions 1 to 4 carry 1 mark each)

1. In the figure, the graph of a polynomial  $p(x)$  is shown. The number of zeroes of  $p(x)$  is:

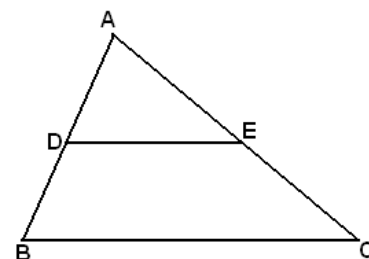
- A. 1
- B. 2
- C. 3
- D. 4



2. In  $\triangle ABC$ , D and E are points on the sides AB and AC respectively such that

$DE \parallel BC$ . If  $\frac{AD}{DB} = \frac{2}{3}$  and  $EC = 4\text{cm}$ , then AE is equal to:

- A. 2.5 cm
- B. 2.6 cm
- C. 3.2 cm
- D. 3.6 cm



3. If  $\tan x = \sin 45^\circ \div \cos 45^\circ$  then x equals to:

- A.  $45^\circ$
- B.  $90^\circ$
- C.  $30^\circ$
- D. 0

4. The modal class in the following frequency distribution is:

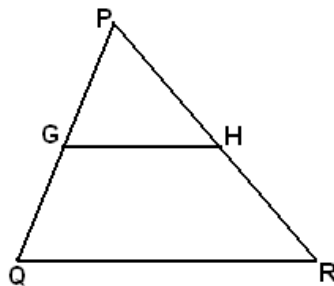
Class	Frequency
0-10	6
10-20	5
20-30	12
30-40	30
40-50	28

- A. 40-50  
B. 30-40  
C. 20-30  
D. None of these

### Section B

(Questions 5 to 10 carry 2 marks each)

5. Find a quadratic polynomial whose zeroes are  $3 + \sqrt{2}$  and  $3 - \sqrt{2}$ .
6. In the given figure, G is the mid-point of the side PQ of  $\triangle PQR$ ,  $GH \parallel QR$ . Prove that H is the mid-point of the side PR of the triangle PQR.



7. Find the HCF of 255 and 867 by Euclid's division algorithm.
8. Verify whether 2 is a zero of the polynomial  $x^3 + 4x^2 - 3x - 18$  or not?
9. Find the mean of the following data:

Classes	Frequency
0-10	7
10-20	3
20-30	15
30-40	5

	$\sum f_i = 30$
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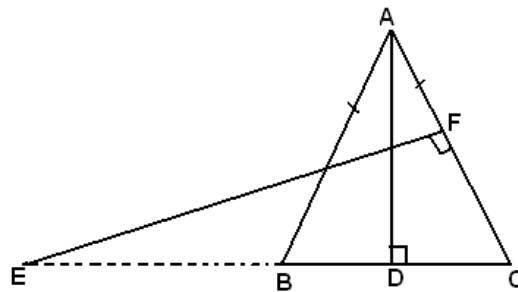
10. Can the number  $6^n$ ,  $n$  being a natural number, end with the digit 5? Give reasons.

### Section C

(Questions 11 to 20 carry 3 marks each)

11. E is a point on side CB produced of an isosceles triangle ABC with  $AB = AC$ .

If  $AD \perp BC$  and  $EF \perp AC$ , then prove that  $\frac{AB}{EC} = \frac{AD}{EF}$



12. Express  $\sin A$  and  $\sec A$  in terms of  $\cot A$  using trigonometric identities.

13. If one of the zero of the quadratic polynomial  $2x^2 - 3x + p$  is 3, then find its other zero. Also find the value of  $p$ .

14. A lending library had a fixed charge for the first three days and an additional charge for each day thereafter. Saritha paid Rs. 27 for a book kept for seven days, while Susy paid Rs. 21 for the book she kept for five days. Find the fixed charge and the charge for each extra day. While returning the book, Susy found that she had accidentally torn a page of the book. Instead of quietly returning the book she offered to pay the required fine to the library. What value is displayed by Susy?

15. Find the mode for the following data which gives the literacy rate (in %) in 40 cities of India.

Literacy rate (%)	45-55	55-65	65-75	75-85	85-95
No. of cities	4	11	12	9	4

Mrs. Sharma is a primary school teacher in a school in Delhi and teaches underprivileged children of her locality in the evenings at her home free of cost. What value is depicted by Mrs. Sharma?

16. Without using trigonometric tables, evaluate:

$$\frac{\cos 37^\circ \cdot \operatorname{cosec} 53^\circ}{\tan 5^\circ \cdot \tan 25^\circ \cdot \tan 45^\circ \cdot \tan 65^\circ \cdot \tan 85^\circ}$$

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

18. Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.

19. If the mean of the following distribution is 27, then find the value of p.

Class	0-10	10-20	20-30	30-40	40-50
Frequency	8	p	12	13	10

20. Prove that:  $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$

### Section D

(Questions 21 to 31 carry 4 marks each)

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. For what values of a and b does the following pair of linear equations have an infinite number of solutions.

$$2x + 3y = 7$$

$$(a - b)x + (a + b)y = 3a + b - 2$$

23. The following table shows the number of runs scored by a certain batsman in different overs:

Over	50-55	55-60	60-65	65-70	70-75	75-80
No. of runs	2	8	12	24	38	16

Change the distribution to a 'more than' type distribution and draw its OGIVE on the graph.

24. Prove that  $(\sin \theta + \operatorname{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$ .
25. Perimeters of two similar triangles ABC and PQR are in the ratio 4:5. If the sum of their areas is  $164 \text{ cm}^2$ , then find the area of each triangle.
26. The cost of 2 kg of apples and 1 kg of grapes in market A on a day was found to be Rs. 160. Moreover, in market B, it was found that the cost of 4 kg of apples and 2 kg of grapes is Rs. 300. Represent the situation algebraically and geometrically.
27. Evaluate the following  $\frac{\sin 30^\circ - \operatorname{cosec} 60^\circ}{\sec 30^\circ + \cos 60^\circ}$  using trigonometric tables.
28. In an equilateral triangle ABC, AE is an altitude on side BC. Show that three times square of one side of this triangle is equal to four times the square of its altitude AE.
29. If  $\tan (A + B) = \sqrt{3}$  and  $\tan (A - B) = \frac{1}{\sqrt{3}}$ ;  $0^\circ < A + B \leq 90^\circ$ ;  $A > B$ , find A and B.
30. 100 students were randomly picked up from a class and the frequency distribution of the number of hours per week they spent playing outdoor games was obtained as follows:

No. of hours per week	1-4	4-7	7-10	10-13	13-16	16-19
No. of students	6	30	40	16	4	4

Determine the median number of hours spent by the students playing in a week. What value is depicted by a player playing in a team?

31. Divide  $3x^2 - x^3 - 3x + 5$  by  $x - 1 - x^2$  and verify the division algorithm.