

CBSE
Class X Mathematics
Term 1
Sample Paper-1

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 11 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.
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Section A

(Questions 1 to 4 carry 1 mark each)

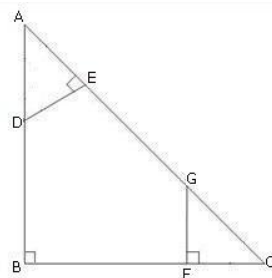
1. The decimal expansion of the rational number $\frac{2^3}{2^2 \cdot 5}$ will terminate after which of the following conditions:
 - A. One decimal place
 - B. Two decimal places
 - C. Three decimal places
 - D. More than three decimal places
2. If one of the zeroes of the quadratic polynomial $(k - 1)x^2 + 1$ is -3, then the value of k is
 - A. $-\frac{8}{9}$
 - B. $\frac{8}{9}$
 - C. $\frac{4}{9}$
 - D. $-\frac{4}{9}$

3. The mean of 6 numbers is 16. With the removal of a number, the mean of remaining numbers is 17. The number removed is:
- 2
 - 22
 - 11
 - 6
4. If $\triangle ABC \sim \triangle RQP$, $\angle A = 80^\circ$, $\angle B = 60^\circ$, the value of $\angle P$ is:
- 60°
 - 50°
 - 40°
 - 30°

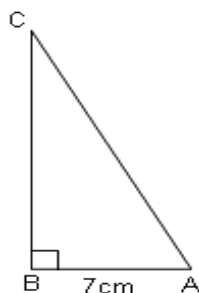
Section B

(Questions 5 to 10 carry 2 marks each)

5. Use Euclid's division algorithm to find H.C.F. of 870 and 225.
6. In the figure, $AB \perp BC$, $GF \perp BC$, $DE \perp AC$. Prove that $\triangle ADE \sim \triangle GCF$.



7. If $\cot \theta = \frac{7}{8}$, find the value of $\frac{(1 + \sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(1 - \cos \theta)}$
8. α, β are the roots of the quadratic polynomial $p(x) = x^2 - (k + 6)x + 2(2k - 1)$. Find the value of k , if $\alpha + \beta = \frac{1}{2}\alpha\beta$.
9. In $\triangle ABC$, $m\angle B = 90^\circ$, $AB = 7\text{cm}$ and $AC - BC = 1\text{ cm}$. Determine the values of $\sin B$ and $\cos B$.



10. Find the median class and the modal class for the following distribution.

C.I	135 -140	140 -145	145 - 150	150 -155	155 - 160	160 - 165
F	4	7	11	6	7	5

Section C

(Questions 11 to 20 carry 3 marks each)

11. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 2x + 1$, then find a quadratic polynomial whose zeroes are $\frac{2\alpha}{\beta}$ and $\frac{2\alpha}{\beta}$.

12. If in a rectangle, the length is increased and breadth is reduced each by 2 metres, then the area is reduced by 28 sq metres. If the length is reduced by 1 metre and breadth is increased by 2 metres, then the area is increased by 33 sq metres. Find the length and breadth of the rectangle.

13. Prove that: $\sqrt{\frac{\sec\theta - 1}{\sec\theta + 1}} + \sqrt{\frac{\sec\theta + 1}{\sec\theta - 1}} = 2\operatorname{cosec}\theta$

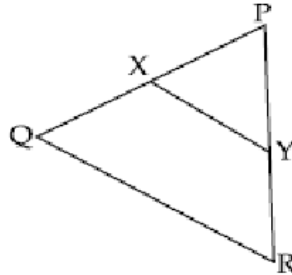
14. For what values of a and b does the following pairs of linear equations have an infinite number of solutions:

$$2x + 3y = 7; a(x + y) - b(x - y) = 3a + b - 2$$

15. Find the modal age of 100 residents of a colony from the following data:

Age in yrs. (more than or equal to)	0	10	20	30	40	50	60	70
No. of Persons	100	90	75	50	28	15	5	0

16. In the figure, $XY \parallel QR$, $\frac{PQ}{XQ} = \frac{7}{3}$ and $PR = 6.3$ cm. Find YR .

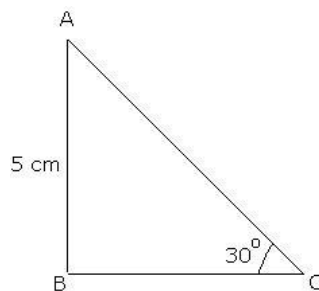


17. Find the value of:

$$\frac{\sec(90^\circ - \theta) \cdot \operatorname{cosec} \theta - \tan(90^\circ - \theta) \cot \theta + \cos^2 25^\circ + \cos^2 65^\circ}{3 \tan 27^\circ \tan 63^\circ}$$

18. A leading library has a fixed charge for the first three days and an additional charge for each day thereafter. Bhavya paid Rs. 27 for a book kept for seven days, while Vrinda paid Rs. 21 for a book kept for five days. Find the fixed charge and charge for each extra day.

19. In triangle ABC, right angled at B, $AB = 5$ cm, $\angle ACB = 30^\circ$. Find the length of BC and AC.



20. If mean of the following data is 86, then what is the value of p ?

Wages (in Rs.)	50-60	60-70	70-80	80-90	90-100	100-110
Number of worker	5	3	4	p	2	13

Section D

(Questions 21 to 31 carry 4 marks each)

21. If $\sec \theta + \tan \theta = p$, then show that $\frac{p^2 - 1}{p^2 + 1} = \sin \theta$.

22. A number of the form 15^n , where $n \in \mathbb{N}$ (the set of natural numbers), can never end with a zero. Justify this statement.

23. For the data given below draw less than ogive curve.

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

24. Solve the equations $2x - y + 6 = 0$ and $4x + 5y - 16 = 0$ graphically. Also determine the coordinate of the vertices of the triangle formed by these lines and the x-axis.

25. Prove that: $\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$

26. The remainder on dividing $x^3 + 2x^2 + kx + 3$ by $x - 3$ is 21. Sanju was asked to find the quotient. He was a little puzzled and was thinking how to proceed. His classmate Gunjan helped him by suggesting that he should first find k and then proceed further. Explain how the question was solved. What value is indicated from this action?

27. In triangle ABC, D is the mid-point of BC and $AE \perp BC$. If $AC > AB$, then show that:

$$AB^2 = AD^2 - BC \times DE + \frac{BC^2}{4}.$$

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

29. In the distribution given below, 50% of the observations are more than 14.4. Find the values of x and y if the total frequency is 20.

Class Interval	0 - 6	6 - 12	12 - 18	18 - 24	24 - 30
Frequency	4	x	5	y	1

30. In a right-angled triangle, the square of the hypotenuse is equal to the sum of squares of the other two sides.

31. Prove that $\sqrt{n-1} + \sqrt{n-1}$ is an irrational number.