

# MOCK CBSE BOARD EXAM



## MATHEMATICS

CLASS X

(PAPER 3)

(AS PER THE GUIDELINES OF CBSE)

Time: 3 Hours

Max. Marks: 80

### **General Instructions**

1. All the questions are compulsory.
2. The question paper consists of 30 questions divided into four sections A, B, C, and D. Questions 1-10 carry 01 mark each, questions 11-15 carry 02 marks each, questions 16-25 carry 03 marks each, and questions 26-30 carry 06 marks each.
3. There is no overall choice. However, an internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 06 marks each. You have to attempt only one of the alternatives in all such questions.
4. Use of calculators is not permitted.

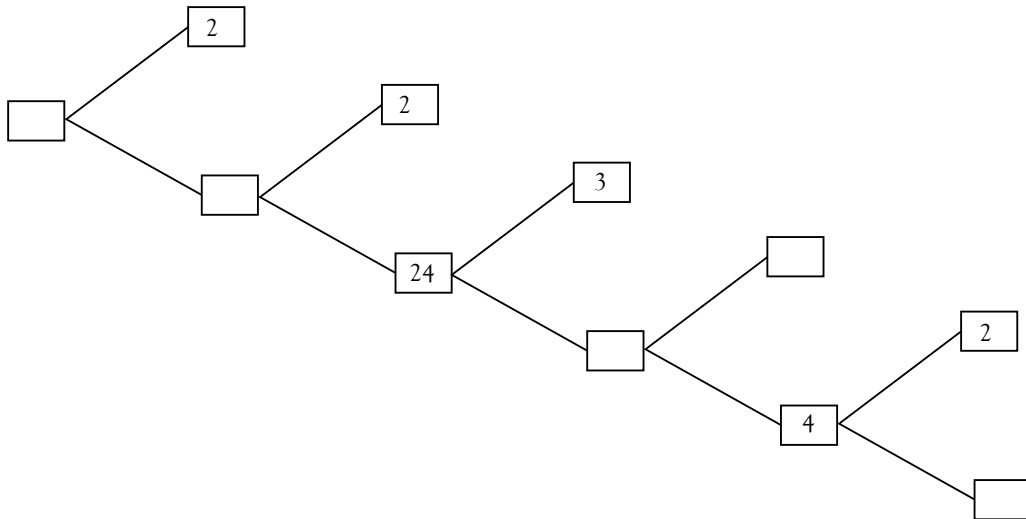
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# All the best!

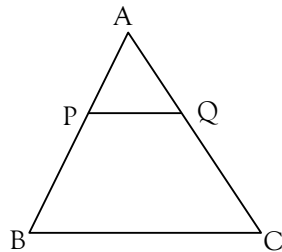
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**SECTION - A**

1. Complete the missing places in the following factor tree.



2. If  $(x + a)$  is a factor of  $2x^2 + 2ax + 5x + 10$ , then  $a = ?$
3. If  $a_n$  of an AP is  $\frac{3n - 5}{6}$ , then common difference  $d = ?$
4. There are two numbers such that their sum is equal to one number and their product is equal to the other number. Write the polynomial with these numbers as zeroes of the polynomial.
5. Write the maximum value of  $1 - 5\sin\theta$ .
6. If  $PQ \parallel BC$  and  $AP = \frac{1}{3} PB$ , then,  $\frac{\text{ar}(\Delta APQ)}{\text{ar}(\Delta ABC)} = ?$



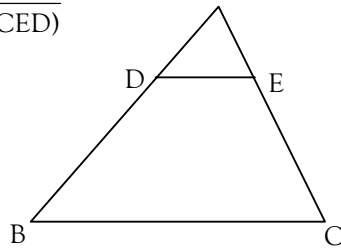
7. The diagonals of a rhombus are 12 cm and 16 cm. Find the side (a) of the rhombus.
8. If surface area of a sphere is  $616 \text{ cm}^2$ , then find the distance along the surface of the sphere between the two points exactly opposite to each other.
9. In a bundle of 50 pens, 14 pens are defective. What is the probability of drawing a non-defective pen?
10. The mean of nine numbers is 7. If one more number is added, the average changes to 8.4. What is the value of the new number?

**SECTION - B**

11. Solve:  $\frac{7}{x} + \frac{8}{y} = 2$  and  $\frac{2}{x} + \frac{12}{y} = 20$
12. Without using trigonometric tables, evaluate the following:  

$$\frac{\cot(90^\circ - \theta) \cdot \sin(90^\circ - \theta)}{\sin \theta} + \frac{\cot 40^\circ}{\tan 50^\circ} - (\cos^2 20^\circ + \cos^2 70^\circ)$$
13. Find the area of a circle, which passes through three points A(3, 1), B(4, 7) and C(-3, 2) and triangle ABC is right angled at A. (Take  $\pi = \frac{22}{7}$ )
14. In the given figure,  $DE \parallel BC$  and  $AD = \frac{1}{4}BD$ , if  $BC = 5$  cm.

Find  $\frac{\text{ar.}(\triangle ADE)}{\text{ar.}(\text{trapezium BCED})}$



15. Ramesh chooses a date at random in January for a party (Refer to the Calendar given).

JANUARY					
Monday		6	13	20	27
Tuesday		7	14	21	28
Wednesday	1	8	15	22	29
Thursday	2	9	16	23	30
Friday	3	10	17	24	31
Saturday	4	11	18	25	
Sunday	5	12	19	26	

Find the probability that he chooses:

- (i) a Wednesday
- (ii) a Tuesday or a Saturday

**OR**

A card is drawn from a pack of 100 cards numbered 1 to 100. Find the probability of drawing a number which is a perfect square but not a perfect cube.

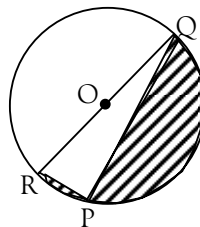
**SECTION - C**

16. Using prime factorisation method, find the HCF and LCM of 72, 126 and 168.  
 Also show that  $\text{HCF} \times \text{LCM} \neq \text{Product of the three numbers}$ .

**OR**

Prove that  $5 + 3\sqrt{2}$  is irrational:

17. If the vertices of a triangle are  $(1, k)$ ,  $(4, -3)$  and  $(-9, 7)$  and its area is 15 square units, find the value of  $k$ .
18. Construct a  $\Delta ABC$  similar to a given equilateral  $\Delta PQR$  with side 5 cm such that each of its sides is  $\frac{6}{7}$ th of the corresponding side of the  $\Delta PQR$
19. Find the area of the shaded region in the given figure, if  $PQ = 24$  cm,  $PR = 7$  cm and  $O$  is the centre of the circle.



20. A hemispherical vessel of internal diameter 18 cm, full of water is emptied into an empty cylindrical vessel of internal radius 6 cm. Find the height to which the water rises in the cylindrical vessel.

**OR**

A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5 cm and its height is 32 cm, find the uniform thickness of the cylinder.

21. Obtain all other zeroes of  $3x^4 + 6x^3 - 2x^2 - 10x - 5$ , if two of its zeroes are  $\sqrt{\frac{5}{3}}$  and  $-\sqrt{\frac{5}{3}}$ .
22. Draw the graph of  $x - y + 1 = 0$  and  $3x + 2y - 12 = 0$ . Calculate the area bounded by these lines and  $x$ -axis.
23. How many terms are there in the A.P. whose first term and 6<sup>th</sup> term is  $-12$  and  $8$ , respectively, and sum of all its terms is  $120$ ?
24. Determine the ratio in which the point  $(-6, a)$  divides the join of  $A(-3, -1)$  and  $B(-8, 9)$ . Also find the value of  $a$ .
25. Show that:  $\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$ .

**OR**

$$2 \sec^2 \theta - \sec^4 \theta - 2 \operatorname{cosec}^2 \theta + \operatorname{cosec}^4 \theta = \cot^4 \theta - \tan^4 \theta.$$

### **SECTION - D**

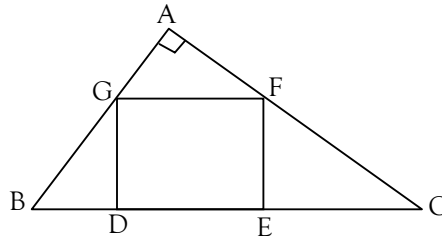
26. An aeroplane left 30 minutes later than its scheduled time and in order to reach its destination 1500 km away, on time, it has to increase its speed by 250 km/hour from its usual speed. Determine its usual speed.

27. The angle of elevation  $\theta$  of the top of a lighthouse as seen by a person on the ground is such that  $\tan \theta = \frac{5}{12}$ . When the person moves a distance of 240 m towards the lighthouse, the angle of elevation becomes  $\phi$ , such that  $\tan \phi = \frac{3}{4}$ . Find the height of the lighthouse.

**OR**

A ladder reaches a window which is 12 m above the ground on one side of the street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 9m high. Find the width of the street, if the length of the ladder is 15 m.

28. (i) State and prove Pythagoras Theorem  
 (ii) In the adjoining figure, DEFG is a square and  $\triangle ABC$  is a right angled triangle, prove that  $\triangle AGF \sim \triangle DBG$ .



**OR**

- (i) Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.  
 (ii) ABC is an isosceles triangles with  $AC = BC$ . If  $AB^2 = 2AC^2$ , prove that ABC is a right triangle.
29. A solid consisting of a right circular cone, standing on a hemisphere; is placed upright in a right circular cylinder, full of water, touching its bottom. Find the volume of water left in the cylinder, having given that the radius of the cylinder is 3 cm and its height is 6 cm ; the radius of the hemisphere is 2 cm and the height of the cone is 4 cm.

30. The following table shows age distribution of persons in a particular region:

Age (in years)	No. of Persons
Below 10	200
Below 20	500
Below 30	900
Below 40	1200
Below 50	1400
Below 60	1500
Below 70	1550
Below 80	1560

Calculate the median age.