

MOCK CBSE BOARD EXAM



MATHEMATICS

CLASS X

(PAPER 2)

(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.

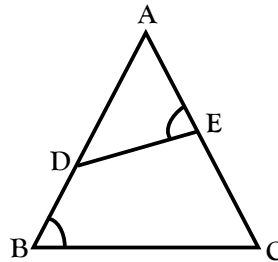
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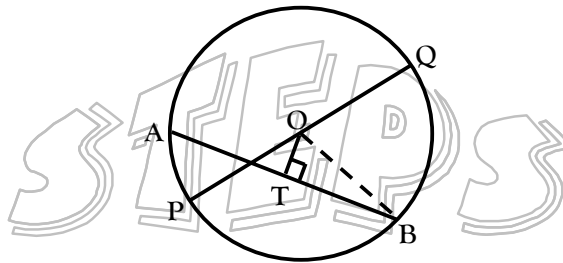
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SECTION - A

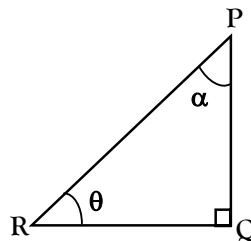
- Find the value of 'a' for which the equation $x^2 - 4x + a = 0$, has real and equal roots.
- A bag contains three red, two green, and five black marbles. Puneet picks up one without looking at it. Find the probability that it is not a green marble.
- The radii of two circles are in the ratio 1 : 4. Find the ratio of their areas.
- In the figure, $\angle AED = \angle ABC$. Where $DB = 2$ cm, $AE = 3$ cm, $AD = 4$ cm and $BC = 5$ cm. Find DE.



- In the given figure, 'O' is the centre of the circle. $OT \perp AB$. If $PQ = 15$ cm and $AB = 12$ cm, find OT.



- Find the ninth term of the A.P. $\frac{1}{m}, \frac{2m+1}{m}, \frac{4m+1}{m}, \dots$
- In the figure below, find $\sin^2 \alpha + \sin^2 \theta$.



- What is the probability that a number, selected randomly from the numbers 1, 2, 3, ..., 19 is a multiple of 3 but not a composite number?
- Give an example of two irrational numbers whose sum is rational and the product is irrational.
- Find discriminant from:
 $abx^2 + (b^2 - ac)x - bc = 0$

SECTION - B

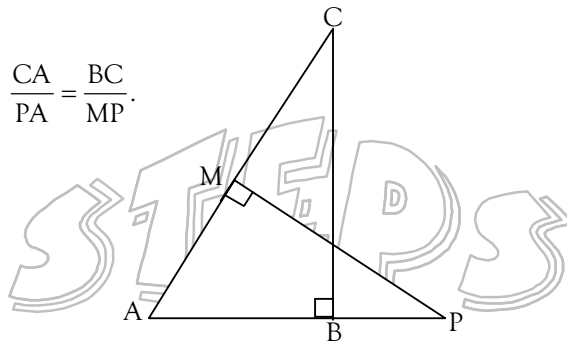
11. On comparing ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the following pair of linear equations are consistent or inconsistent. $\frac{3}{2}x + \frac{5}{3}y = 7; 9x - 10y = 14$
12. Show that:
 (i) $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ = 1$, (ii) $\cos 38^\circ \cos 52^\circ - \sin 38^\circ \sin 52^\circ = 0$

OR

$$\sqrt{\frac{1 + \sin^2 \theta \cdot \sec^2 \theta}{1 + \cos^2 \theta \cdot \operatorname{cosec}^2 \theta}} = \tan \theta$$

13. The line joining the point (2, -1) and (5, -6) is bisected at P. If P lies on the line $2x + 4y + k = 0$ find the value of k.
14. In the adjoining figure, ABC and AMP are two right triangles, right-angled at B and M respectively. Prove that:

(i) $\Delta ABC \sim \Delta AMP$ (ii) $\frac{CA}{PA} = \frac{BC}{MP}$.



15. From a bag containing 5 red, 8 black and 7 blue balls, a ball is selected at random. Find the probability that (i) it is not a red ball (ii) it is not a blue ball.

SECTION - C

16. Use Euclid's Division Lemma to show that the cube of any positive integer is of the form $9m$ or $9m + 1$ or $9m + 8$.

OR

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

17. Find all the zeroes of the polynomial $x^4 + x^3 - 34x^2 - 4x + 120$, if two of its zeroes are 2 and -2.
18. Draw the graph of the following pair of linear equations to find the solution of the equations.

$$x + 3y = 6$$

$$2x - 3y = 12$$

Hence, find the area of the region bounded by

$$x = 0, y = 0 \text{ and } 2x - 3y = 12.$$

19. Find the common difference of an A.P. whose first term is 100 and the sum of its first six terms is 5 times the sum of its next 6 terms.

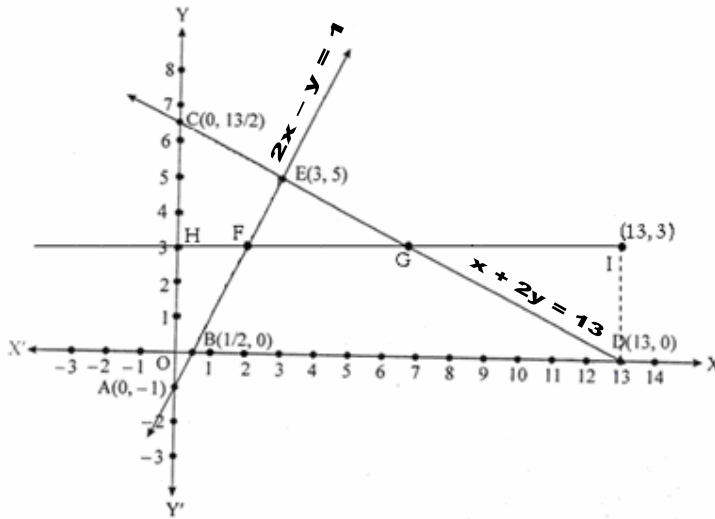
20. If $\frac{\cos A}{\cos B} = m$ and $\frac{\cos A}{\sin B} = n$, show that:
 $(m^2 + n^2) \cos^2 B = n^2$

OR

Prove that:

$$\frac{\cos^3 A + \sin^3 A}{\cos A + \sin A} + \frac{\cos^3 A - \sin^3 A}{\cos A - \sin A} = 2$$

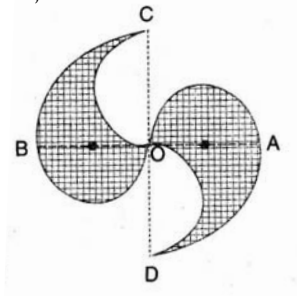
21. Observe the graph given below and find the ratio of ar(ΔEFG) and ar(ΔBED)



22. If (3, 2) and (-3, 2) are two vertices of an equilateral triangle which contains the origin within it, what are the coordinates of the third vertex?
23. Draw a line segment AB of length 8 cm. Taking A as the centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.
24. In ΔABC , if AD is the median, show that $AB^2 + AC^2 = 2(AD^2 + BD^2)$.
25. Find the area of the region bounded by two concentric circles, if the length of the chord of the outer circle, touching the inner circle, is 28 cm.

OR

Find the area of the shaded region, if $OA = OB = OC = OD = 14$ cm.



SECTION - D

26. Subhash wishes to fit three rods in the form of a right triangle. The length of hypotenuse must be greater than the length of the base by 4 cm whereas the hypotenuse must be 8 cm longer than the third side (altitude). Find the lengths of the three rods.

OR

Two pipes running together can fill a cistern in 6 minutes. If one pipe takes 5 minutes more than the other to fill the cistern, find the time in which each pipe would fill the cistern.

27. A man in a boat rowing away from a light house 100 m high, takes 2 minutes to change the angle of elevation of the top of the light house from 60° to 45° . Find the speed of the boat.

OR

The angles of elevation of the top of a tower, as seen from two points A and B situated in the same line and at distances p and q respectively from the foot of the tower are complementary. Prove that the height of the tower is \sqrt{pq} .

28. "The ratio of the areas of similar triangles is equal to the ratio of the squares on the corresponding sides." Prove.

Using the above theorem, prove that the area of the equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal.

29. A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in her field, which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/h, in how much time will the tank be filled?
30. Following data gives details of height of 50 boys of a school.

Height	No. of boys
Less than 145	5
Less than 150	9
Less than 155	25
Less than 160	37
Less than 165	44
Less than 170	50

Draw the graph of less than and more than ogives from the given detail. Find the value of median.