

MATHEMATICS CLASS X - 2012

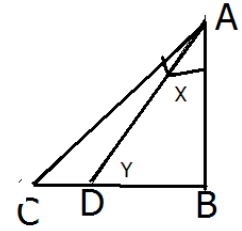
SECTION A

Q1. The values of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots is

- (a) 0 only (b) 0, 4 (c) 8 only (d) 0, 8

Q2. In the given figure, the respective values of y and x are

- (a) 60° and 30° (b) 45° and 60° (c) 60° and 45°
 (d) 30° and 45°



Q3. The next term of the given series $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$ would be

- (a) $\sqrt{50}$ (b) $\sqrt{70}$ (c) $\sqrt{80}$ (d) $\sqrt{90}$

Q4. To draw a pair of tangents to a circle which are inclined to each other at an angle of 35° it is required to draw tangents at the end points of those two radii of the circle, the angle between which is

- (a) 105° (b) 70° (c) 140° (d) 145°

Q5. If a die is thrown once the probability of getting a prime number is

- (a) $1/2$ (b) $1/3$ (c) $1/4$ (d) $1/5$

Q6. The ordinate of a point is twice its abscissa. If its distance from the point (4,3) is $\sqrt{10}$, then the coordinates of the point are

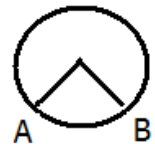
- (a) (1,2) or (3,5) (b) (1,2) or (3,6) (c) (2,1) or (6,3) (d) (2,1) or (3,6)

Q7. The ratio in which the line segment joining A(3,4) and B(-2,1) is divided by the y-axis is

- (a) 1:2 (b) 2:3 (c) 3:2 (d) 2:5

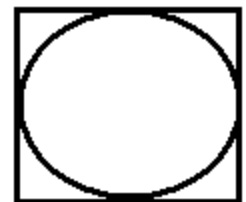
Q8. The given figure shows a sector of a circle of radius 10.5 cm. The perimeter of the sector is

- (a) 28 cm (b) 30 cm (c) 32 cm (d) 34 cm



Q9. The radius of a cylindrical tank is 28m. If its capacity is equal to that of a rectangular tank of size 28m x 16m x 11m then, its depth is

- (a) 2m (b) 3m (c) 4m (d) 5m



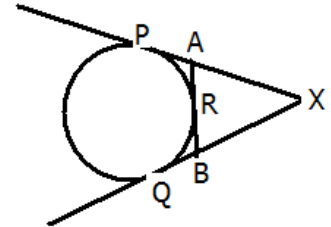
Q10. In given figure, a circle of radius 7.5cm is inscribed in a square, the remaining area of the square is

- (a) 48.91 cm sq. (b) 48.375 cm sq. (c) 46 cm sq. (d) 52.32 cm sq.

Q11. If the 3rd and 6th term of an AP are 7 and 13 respectively, find the 10th term.

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Q12. In the given figure, XP and XQ are tangents from X to the circle with centre O. R is a point on the circle. Prove that $XA+AR=XB+BR$.

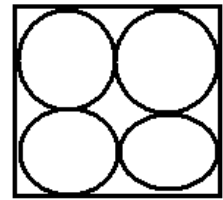


Q13. A letter is chosen at random from the letters of the word 'ASSASSINATION'. Find the probability that the letter chosen is a (i) vowel (ii) consonant

OR

Rekha tosses a one rupee coin three times and wins the game if she gets the same outcome every time. What are her chances to win?

Q14. In given figure, ABCD is a square of side 14 cm and four congruent circles are inscribed in it. Find the remaining area of the square.



Q15. A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel.

Q16. Determine the set of values of p for which the quadratic equation $px^2 + 6x + 1 = 0$ has real roots.

Q17. Find the condition that the point (x, y) may lie on the line joining $(3,4)$ and $(-5,-6)$.

Q18. Two concentric circles are of radii 5cm and 3cm. Find the length of the chord of the larger circle which touches the smaller circle.

SECTION C

Q19. Solve: $\frac{1}{a} + \frac{1}{b} + \frac{1}{x} = \frac{1}{(a + b + c)}$

Q20. Find the area of the quadrilateral ABCD whose vertices are $A(1,1)$, $B(7,-3)$, $C(12,2)$ and $D(7,21)$ respectively.

OR

One end of a line of length 10 units is at the point $(-3, 2)$. If the ordinate of the other end is 10, then find the abscissa of other end.

Q21. A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30° . A girl standing on the roof of a 20m high building finds the angle of elevation of the same bird to be 45° . The boy and the girl are on the opposite sides of the bird. Find the distance of the bird from the girl.

OR,

A tower is 50m high. Its shadow is x metres shorter when the sun's altitude is 45° than when it was 30° . Find the value of x .

Q22. If the point (x, y) is equidistant from the points $(a + b, b - a)$ and $(a - b, a + b)$, then prove that $bx = ay$.

Q23. Find the sum of the first 25 terms of an AP whose n th term is given by $3n + 2$.

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Q24. Draw a circle of any convenient radius. Draw a pair of tangents to the circle such that they are inclined to each other at an angle of 90° .

Q25. One card is drawn from a well shuffled pack of 52 cards. Calculate the probability of getting

(i) A king or a queen (ii) Neither a heart nor a red king

Q26. The cost of fencing a circular field at the rate of Rs. 24 per metre is Rs. 5280. The field is to be ploughed at the rate of Rs. 0.50 per m^2 . Find the cost of ploughing the field. (Take $\pi = 22/7$) **OR**,

The area of an equilateral triangle ABC is 17320.5 cm^2 . With each vertex of triangle as the centre, a circle is drawn with radius equal to half the length of the side of the triangle. Find the area of the triangle not included in the circles. (use $\pi = 3.14$ and $\sqrt{3} = 1.73205$).

Q27. The ratio of the radii of two spheres is 1:2. The two spheres are melted together to form a cylinder of height which is 12 times its radius. So what is the ratio of the radius of the smaller sphere and the cylinder?

Q28. If h , c and V respectively are the height, the curved surface area and the volume of cone, then prove that $3\pi Vh^3 - c^2h^2 + 9V^2 = 0$

SECTION D

Q29. The difference of two numbers is 5 and the difference of their reciprocals is $1/10$. Find the two numbers.

OR

The difference of square of two natural numbers is 45. The square of the smaller number is four times the larger number. Find the two numbers.

Q30. The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last terms to the product of the two middle terms is 7:15. Find the numbers. **OR**,

If S_1 , S_2 and S_3 respectively be the sum of n , $2n$ and $3n$ terms of an AP, show that $S_3 = 3(S_2 - S_1)$.

Q31. From a window, h metres high above the ground, of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are α and β respectively. Show that the height of the opposite house is $h(1 + \tan\alpha \cot\beta)$ metres.

Q32. The incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. Show that $AF + BD + CE = AE + BF + CD = 1/2$ (Perimeter of ΔABC)

Q33. Prove that the tangent of a circle is perpendicular to the radius at the point of contact.

Q34. A building is in the form of a cylinder surmounted by a hemispherical dome. The base diameter of the dome is equal to $2/3$ of the total height of the building. Find the height of the building, if it contains $67 \frac{1}{21} \text{ m}^3$ of air.