Sample Paper 2013-14
Class - X
Mathematics

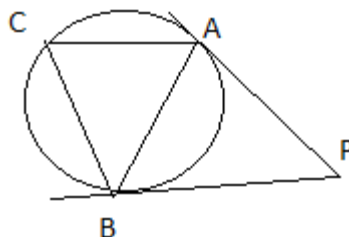..

General Instructions:

(i)   All questions are compulsory. There are three sections A, B, C and D in the question paper.

(ii)   Section A: Q. Nos. 1 to 8 carry 1 mark each.
   Section B: Q. Nos.9 to 14 carry 2 marks each.
   Section C: Q. Nos. 15 to 24 carry 3 mark each.
   Section D: Q. Nos. 25 to 34 carry 4 mark each.

(iii)   There is no overall choice, however internal choices has been provided in one question of 2 marks, three questions of 3 marks and 2 questions of 4 marks. You have to attempt only one of the alternatives in all such questions.

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Section A

1. For the quadratic eqn. $x^2 - 2x + 1 = 0$ the value of $x + \dfrac{1}{x}$

(i)-1   (ii) 1   (iii) 2   (iv) -2.

2. If there are p terms in an AP, then the nth term from the end is

   (a) A + n   (c) N – a
   (b) 2a   (d) None of these

3. If tangents PA & PB are drawn to a circle such that $\angle APB = 30^0$ & chord AC is drawn || to the tangent PB then $\angle ABC =$
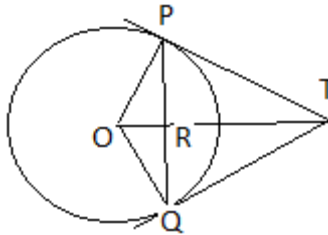

(i) 30^0 (ii) 45^0 (iii) 60^0 (iv) 90^0

4. If the equation $kx^2 + 4x + 1 = 0$ has real & distinct roots, then

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(i) k < 4   (ii) k > 4   (iii) $k \leq 4$ (iv) $k \geq 4$

5. A chess board has 64 equal squares & the area of each square is 6.25cm^2. A border around the board is 2cm wide. Find the length of the side of the chess board.

(i) 24cm   (ii) 25cm   (iii) 26cm   (iv) 20cm

6. The S.A. of a cube is equal to the S.A. of a sphere, then the ratio of their volumes is

(i) 11 : $\sqrt{231}$ (ii) 11 : 15   (iii) 15 : 11   (iv) 6 : Π.

7. A cone is cut into 2 parts by the horizontal plane passing through the midpoint of its axis, the ratio of the volumes of the upper part & the cone is

(i) 1:2   (ii) 1:4   (iii) 1:6   (iv) 1:8

8. If the radius of the circle is diminished by 10% then the area will be diminished by
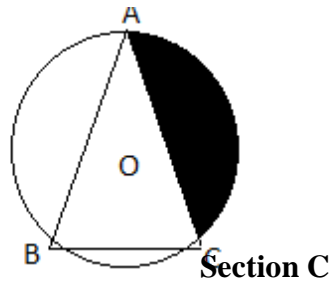
(i) 10%   (ii) 19%   (iii) 20 %   (iv) 36 %.

Section B

9. When we lower, our head to look at the object, the angle formed by the line of sight with the horizontal is known as

A) Obtuse angle   B) angle of elevation   C) angle of depression   D) acute angle.

10. A number x is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3 the probability that |x| < 2 is

(i) 5/7   (ii) 2/7   (iii) 3/7   (iv) 1/7

11. There is a square field whose side is 44 m. A square flowerbed is prepared in its centre leaving a gravel path all around the flower bed. The total cost of laying the flower bed & gravelling the path @ ₹ 2.75 & ₹ 1.50 per sq m respectively is ₹ 4904. Find the width of the gravel path.

12. The sum of the first 6 terms of the AP is 42. The ratio of its 10th term to its 30th term is 1 : 3. Calculate the 1st & the 13th term of the A.P.

13. PO $\perp$ QO. The tangents to the circle at P & Q intersect at point T. Prove that PQ & OT are right bisectors of each other.

14. ABC is an equilateral Δ inscribed in a circle of radius 4cm with centre O Find the area of the shaded region.
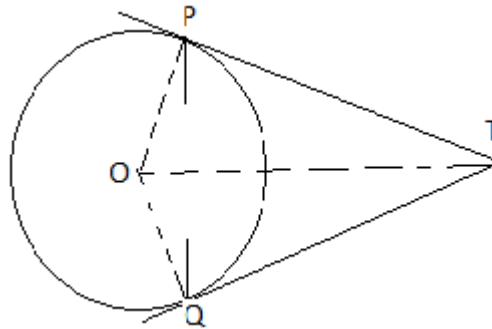

Section C

15. A cylindrical pipe has inner diameter 7 cm & water flows through it @ 192.5 litres per minute. Find the rate of flow in kilometers per hour.

16. If P (x, y) is any point on the line joining the points A (a, 0) & B (0, B). Then show that $\frac{x}{a} + \frac{y}{b} = 1$.

17. Find the points on the y axis whose distances from the points (6, 7) and (4, -3) are in the ratio 1:2.

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18. A number x is selected from the numbers 1, 2, 3 & then a second number y is randomly selected from the numbers 1, 4, 9. What is the probability that the product x y of the two numbers will be less than 9.

19. 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.

OR

If the roots of the equation $12x^2 + mx + 5 = 0$ are in the ratio 3:2, then m=?

20. If an A.P. consists of n terms with 1st term a & n^{th} term l show that the sum of the mth term from the beginning & m^{th} term from the end is $a + l$

21. Two tangents TP & TQ are drawn to a circle with centre O from an external point T. prove that $\angle PTQ = 2\angle OPQ$.

22. Let ABC be a right Δ in which AB=3 cm & $\angle B = 90^0$ BD is the perpendicular from B on AC The circle through B, C, and D is drawn. Construct tangents from this point to the circle.

23. Three horses are tied to three vertices of a Δ having sides 10m, 12m & 14m with ropes of length 7m each; find the area grazed by the 3 horses.

24. Water is flowing @ 5 km/hr through a pipe of diameter 14 cm into a rectangular tank which is 50m long & 44m wide. Determine the time in which the level of the water in the tank will rise by 7cm.
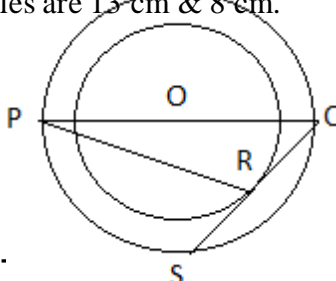
Section D

25. If the angle of elevation of a cloud from a point h metres above a lake is α & the angle of depression of its reflection in the lake be β. prove that the distance of the cloud from the point of observation is $\dfrac{2h\sec\alpha}{\tan\beta - \tan\alpha}$.

26. Let the opposite angular points of a square be (3, 4) & (1, -1). Find the coordinates of the remaining angular points.

27. If P(2-1)Q(34)R(-23)S(-3-2) be four points in a plane, show that PQRS is a rhombus but not a square. Also, find the area of the rhombus.

28. Two dice are thrown simultaneously. What is the probability that (i) 5 will not come up on either of them. (ii) 5 will come up on at least once (iii) 5 will come up at both dice.

29. The perimeter of right Δ is 60cm. Its hypotenuse is 25cm. Find the area of the Δ.

OR

A swimming pool is filled by 3 pipes with uniform flow, The first two pipes operating simultaneously, fill the pool in the same time during which the pool is filled by the 3rd pipe alone. The 2nd pipe fills the pool 5 hours faster than the 1st pipe & 4 hours slower than the 3rd pipe. Find the time required by each pipe to fill the pool separately.

30. Find the sum of numbers from 1 to 100 which are neither divisible by 2 nor by 5.

31. In two concentric circles with centre O, PQ is diameter of outer circle & QS is the tangent line to the inner circle touching it in R & outer circle in S. Find the length of PR, if radii of two circles are 13 cm & 8 cm.

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32. The total height of a plumb line is 14 cm, its radius is 7cm. Find its volume & total surface area.

(Hint: plumb line is a combination of cone & hemisphere)

33. A milk container is made of metal sheet in the shape of frustum of a cone whose volume is $10459\frac{3}{7}cm^3$ The radii of the lower & the upper ends is is 8 cm & 20 cm respectively. Find the cost of metal sheet used in making the container @ ₹1.40per cm².

34. From the top of a building AB, 60 m high, the angles of depression of the top & bottom of a vertical lamp post CD are observed to be 30^0 & 60^0 respectively. Find

(i)   The horizontal distance b/w AB & CD.
(ii)   The height of the lamp post.
(iii)   The difference b/w the heights of the building & the lamp post.

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