

**CBSE**  
**Class X Mathematics**  
**Board Paper – 2015**  
**All India Set – 2**

**Time: 3 hours**

**Total Marks: 90**

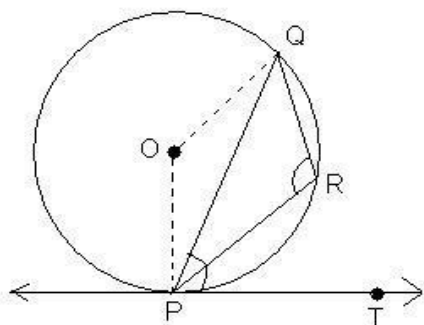
General Instructions:

- (i) All questions are compulsory.
- (ii) The question paper consists of 31 questions divided into four sections – A, B, C and D.
- (iii) Section A contains 4 questions of 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 11 questions of 4 marks each.
- (iv) Use of calculators is not permitted.

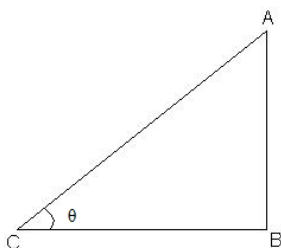
**SECTION A**

Question numbers 1 to 4 carry 1 mark each.

1. In the below figure, PQ is a chord of a circle with centre O and PT is a tangent. If  $\angle QPT = 60^\circ$ , find  $\angle PRQ$ .



2. If the quadratic equation  $px^2 - 2\sqrt{5}px + 15 = 0$  has two equal roots then find the value of p.
3. In the below figure, a tower AB is 20 m high and BC, its shadow on the ground, is  $20\sqrt{3}$  m long. Find the Sun's altitude.

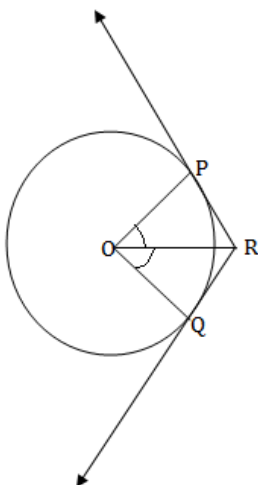


4. Two different dice are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6.

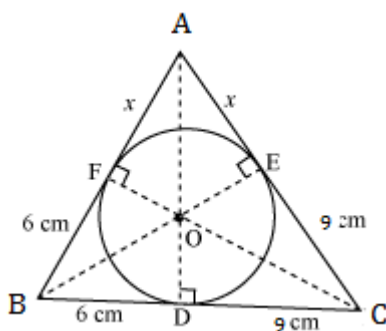
### SECTION B

Question numbers 5 to 10 carry 2 marks each.

5. Find the relation between  $x$  and  $y$  if the points  $A(x, y)$ ,  $B(-5, 7)$  and  $C(-4, 5)$  are collinear.
6. In an A.P., if  $S_5 + S_7 = 167$  and  $S_{10} = 235$ , then find the A.P., where  $S_n$  denotes the sum of its first  $n$  terms.
7. In the below figure, two tangents  $RQ$  and  $RP$  are drawn from an external point  $R$  to the circle with centre  $O$ . If  $\angle PRQ = 120^\circ$ , then prove that  $OR = PR + RQ$ .



8. In the below figure, a triangle  $ABC$  is drawn to circumscribe a circle of radius 3 cm, such that the segments  $BD$  and  $DC$  are respectively of lengths 6 cm and 9 cm. If the area of  $\Delta ABC$  is  $54 \text{ cm}^2$ , then find the lengths of sides  $AB$  and  $AC$ .



9. Solve the following quadratic equation for  $x$ :  
 $4x^2 + 4bx - (a^2 - b^2) = 0$

10. If  $A(4, 3)$ ,  $B(-1, y)$  and  $C(3, 4)$  are the vertices of a right triangle  $ABC$ , right-angled at  $A$ , then find the value of  $y$ .

### SECTION C

Question numbers 11 to 20 carry 3 marks each.

11. Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2 m and height 4 m with the conical upper part of same diameter but height 2.8 m, and the canvas to be used costs Rs. 100 per sq. m, find the amount, the associations will have to pay. What values are shown by these associations? [Use  $\pi = \frac{22}{7}$ ]
12. The angle of elevation of an aeroplane from point  $A$  on the ground is  $60^\circ$ . After flight of 15 seconds, the angle of elevation changes to  $30^\circ$ . If the aeroplane is flying at a constant height of  $1500\sqrt{3}$  m, find the speed of the plane in km/hr.
13. A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of each bottle, if 10% liquid is wasted in this transfer.
14. The probability of selecting a red ball at random from a jar that contains only red, blue and orange balls is  $\frac{1}{4}$ . The probability of selecting a blue ball at random from the same jar is  $\frac{1}{3}$ . If the jar contains 10 orange balls, find the total number of balls in the jar.
15. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of Rs. 5 per sq. cm. [Use  $\pi = 3.14$ ]
16. If the coordinates of points  $A$  and  $B$  are  $(-2, -2)$  and  $(2, -4)$  respectively, find the coordinates of  $P$  such that  $AP = \frac{3}{7}AB$ , where  $P$  lies on the line segment  $AB$ .
17. 504 cones, each of diameter 3.5 cm and height 3 cm, are melted and recast into a metallic sphere, Find the diameter of the sphere and hence find its surface area. [Use  $\pi = \frac{22}{7}$ ]

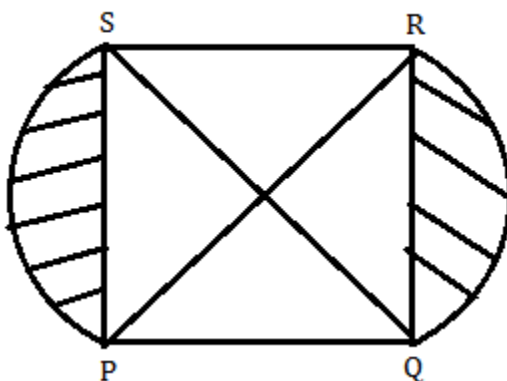
18. All the vertices of a rhombus lie on a circle. Find the area of the rhombus, if the area of the circle is  $1256 \text{ cm}^2$ . [Use  $\pi = 3.14$ ]
19. Solve for  $x$  :  

$$2x^2 + 6\sqrt{3}x - 60 = 0$$
20. The 16<sup>th</sup> term of an A.P. is five times its third term. If its 10<sup>th</sup> term is 41, then find the sum of its first fifteen terms.

### SECTION D

Question numbers 21 to 31 carry 4 marks each.

21. Prove that the tangent drawn at the mid-point of an arc of a circle is parallel to the chord joining the end points of the arc.
22. At a point A, 20 metres above the level of water in a lake, the angle of elevation of a cloud is  $30^\circ$ . The angle of depression of the reflection of the cloud in the lake, at a A is  $60^\circ$ . Find the distance of the cloud from A.
23. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is
- a card of spade or an ace.
  - a black king.
  - neither a jack nor a king
  - either a king or a queen.
24. In the below figure, PQRS is square lawn with side  $PQ = 42$  metres. Two circular flower beds are there on the sides PS and QR with centre at O, the intersections of its diagonals. Find the total area of the two flower beds (shaded parts).



25. From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4.2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4 cm thickness. Find the length of the wire. [Use  $\pi = \frac{22}{7}$ ]
26. The diagonal of a rectangular field is 16 metres more than the shorter side. If the longer side is 14 metres more than the shorter side, then find the lengths of the sides of the field.
27. Find the 60<sup>th</sup> term of the A.P. 8, 10, 12, ....., if it has a total of 60 terms and hence find the sum of its last 10 terms.
28. A bus travels at a certain average speed for a distance of 75 km and then travels a distance of 90 km at an average speed of 10 km/h more than the first speed. If it takes 3 hours to complete the total journey, find its first speed?
29. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
30. Construct a right triangle ABC with AB = 6 cm, BC = 8 cm and  $\angle B = 90^\circ$ . Draw BD, the perpendicular from B on AC. Draw the circle through B, C and D and construct the tangents from A to this circle.
31. Find the values of k so that the area of the triangle with vertices  $(k + 1, 1)$ ,  $(4, -3)$  and  $(7, -k)$  is 6 sq. units.