

CBSE Board
Class X Mathematics
Sample Paper 9

Time: 3 hrs

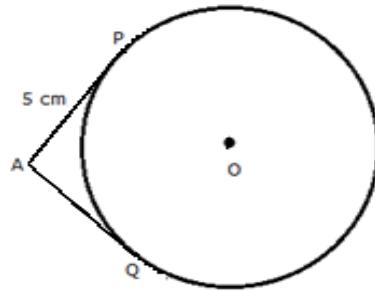
Total Marks: 80

General Instructions:

1. All questions are **compulsory**.
2. The question paper consists of **30** questions divided into **four sections** A, B, C, and D.
Section A comprises of **6** questions of 1 mark each, **Section B** comprises of **6** questions of 2 marks each, **Section C** comprises of **10** questions of 3 marks each and **Section D** comprises of **8** questions of 4 marks each.
3. Use of calculator is **not** permitted.

Section A
(Questions 1 to 6 carry 1 mark each)

1. If the probability of winning a game is 0.3, then find the probability of losing it.
OR
Two coins are tossed simultaneously. Find the probability of getting exactly one head.
2. A vertical tower is 20 m high. A man at some distance from the tower knows that the cosine of the angle of the elevation of the top of tower is 0.5. Find the distance of the man from the foot of the tower.
3. In the figure, the pair of tangents AP and AQ drawn from an external point A to a circle with centre O are perpendicular to each other and length of each tangent is 5 cm. Find the radius of the circle.

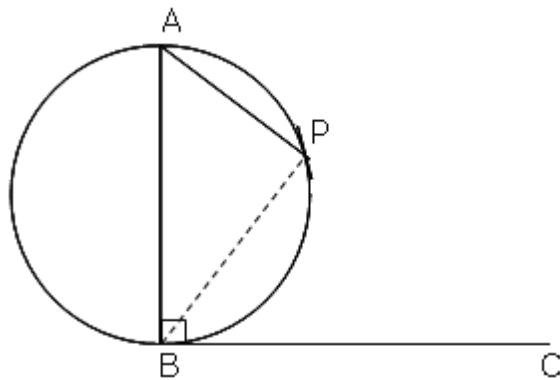


4. If the sum of n terms of an A.P. is $3n^2 + 5n$ then which of its terms is 164?
OR
For which value of p are $(2p - 1)$, 7 and $3p$ three consecutive terms of an AP?
5. The decimal expansion of the rational number $\frac{2^3}{2^2 \cdot 5}$ will terminate after how many decimal places?

6. $\Delta ABC \sim \Delta PQR$. M is the mid-point of BC and B is the mid-point of QR. The area of ΔABC = 100 sq. cm and that of ΔPQR = 144 sq. cm. If AM = 4 cm, then find PN.

Section B
(Questions 7 to 12 carry 2 marks each)

7. Which term of the A.P.: 5, 15, 25, will be 130 more than the 31st term?
8. Can the number 4^n , n being a natural number end with the digit 0? Given reasons.
9. AB is a diameter of a circle. BC is the tangent to the circle at B as shown in the given figure. Show that $\angle PBC = \angle BAP$.



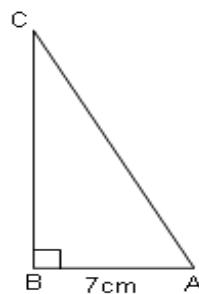
10. A car travels a distance of 0.99 km in which each wheel makes 450 complete revolutions. Find the radius of its wheels.

OR

Find the radius of a circle whose circumference is 52.8 cm.

11. If $\cot \theta = \frac{7}{8}$, find the value of $\frac{(1+\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(1-\cos \theta)}$

12. In ΔABC , $m\angle B = 90^\circ$, $AB = 7$ cm and $AC - BC = 1$ cm. Determine the values of $\sin C$ and $\cos C$.



OR

If $\tan x = 3 \cot x$ then find the value of x .

Section C
(Questions 13 to 22 carry 3 marks each)

- 13.** The horizontal distance between two towers is 140 m. The angle of elevation of the top of the first tower when seen from top of the second tower is 30° . If the height of the second tower is 60 m, find the height of the first tower.

OR

In the figure, the angle of elevation of the top P of a vertical tower from a point X is 60° . At a point Y, 40 m vertically above X the angle of elevation is 45° . Find the:

- height PQ.
- distance XQ.

- 14.** If $a \neq b \neq c$, prove that the points (a, a^2) , (b, b^2) and (c, c^2) can never be collinear.

- 15.** In a school, students thought of planting trees around the school to reduce air pollution. It was decided that the number of trees which each section of each class would plant will be the same as the class in which they are studying, e.g., a section of class-I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. How many trees will be planted by the students? What value can you infer from the planting of trees by the students?

- 16.** Solve: $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$, where $x \neq -4, 7$

OR

Solve $2x^2 + 2x - 3 = 0$, giving your answer correct up to one decimal place.

- 17.** Show that $6 + \sqrt{2}$ is irrational.

- 18.** A motor boat whose speed is 24 km/h in still water takes 1 hour more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream.

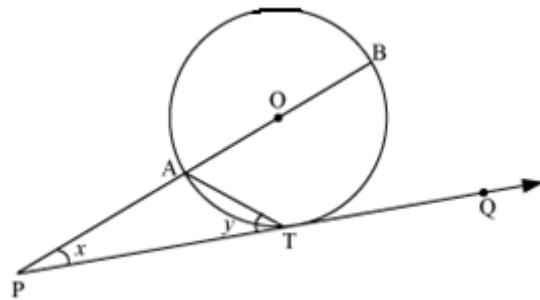
- 19.** If the point (x, y) is equidistant from the points $(a+b, b-a)$ and $(a-b, a+b)$, then prove that $bx = ay$.

- 20.** An integer is chosen at random from 1 to 200. What is the probability that the integer chosen is divisible by 6 or 8?

OR

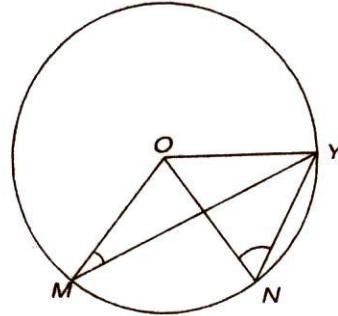
One card is drawn from a pack of 52 cards, each of which is equally likely to be drawn. Find the probability that the card drawn is

- i. either red or king
 - ii. a red face card
 - iii. '10' of a black suit
- 21.** In the given figure, the diameter AB of the circle with centre O is extended to a point P and PQ is a tangent to the circle at the point T. If $\angle BPT = x$ and $\angle ATP = y$, then prove that $x + 2y = 90^\circ$.



OR

In the given figure, $m\angle ONY = 50^\circ$, $m\angle OMY = 15^\circ$, find $m\angle MON$.

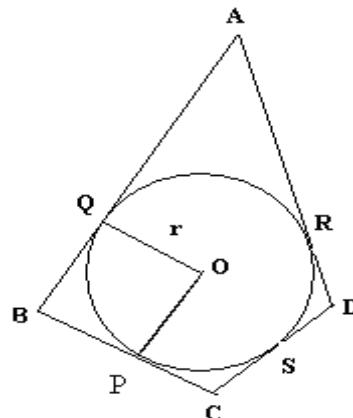


- 22.** Find the median for the following frequency distribution:

Class Interval	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
Frequency	2	4	8	9	4	2	1

Section D
(Questions 23 to 30 carry 4 marks each)

- 23.** A circle is inscribed in a quadrilateral ABCD in which $m\angle B = 90^\circ$. If $AD = 23$ cm, $AB = 29$ cm and $DS = 5$ cm. Find the radius of the circle.



- 24.** The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the length of the sides of the field.

OR

John sends his servant to the market to buy oranges worth Rs. 15. The servant having eaten three oranges on the way, John ends up paying 25 paise more per orange than the market price. Taking x to be the number of oranges which John receives, form a quadratic equation in x . Hence, find the value of x .

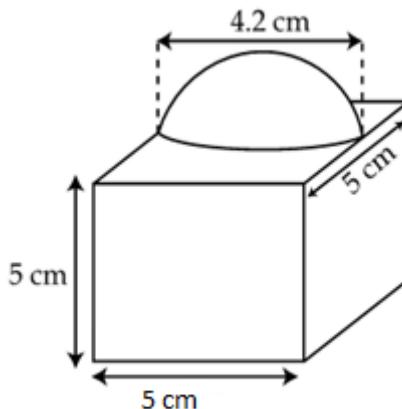
- 25.** Two circles with centre O and O' of radii 3 cm and 4 cm respectively, intersect at two points P and Q such that OP and $O'P$ are tangents to the two circles. Find the length of the common chord PQ.
- 26.** 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on. In how many rows are the 200 logs placed and how many logs are in the top row? What value is depicted in the pattern of logs?
- 27.** From an airplane vertically above a straight horizontal road, the angles of depression of two consecutive kilometers stones on opposite sides of the airplane are observed to be 60° and 30° . Show that the height of airplane above the road is $\frac{\sqrt{3}}{4}$ km.

OR

A guard observes an enemy boat, from an observation tower at a height of 180 m above sea level, at an angle of depression of 29° .

- (i) Calculate, to the nearest metre, the distance between the boat and the foot of observation tower.

- (ii) After sometime, it is observed that the boat is 200 m from the foot of the observation tower. Calculate the angle of depression.
28. A container open from the top, made up of a metal sheet is in the form of a frustum of a cone of height 8 cm with radii of its lower and upper ends as 4 cm and 10 cm respectively. Find the cost of oil which can completely fill the container at the rate of Rs. 50 per litre. Also, find the cost of metal used, if it costs Rs. 5 per 100 cm^2 .
- OR**
- The area of the base of a right circular cone is 28.26 sq. cm. If its height is 4 cm, find its volume and the curved surface area. (use $\pi = 3.14$)
29. A decorative block, as shown in the figure, is made up of two solids - a cube and a hemisphere with diameter 4.2 cm fixed on top of the cube. Find total surface area of the block. (take $\pi = \frac{22}{7}$)



30. A card is drawn at random from a well shuffled deck of playing cards. Find the probability that the card drawn is
- a king or a jack
 - a non-ace card
 - a red card
 - neither a king nor a queen