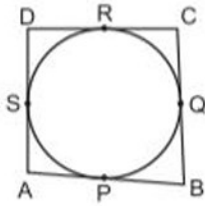




Case Study Based Questions

Case Study 1

In a park, four poles are standing at positions A, B, C and D around the fountain such that the cloth joining the poles AB, BC, CD and DA touches the fountain at P, Q, R and S respectively as shown in the figure.



Based on the above information, solve the following questions:

Q1. If O is the centre of the circular fountain, then $\angle OSA =$

- a. 60°
- b. 90°
- c. 45°
- d. All of these

Q2. Which of the following is correct?

- a. $AS = AP$
- b. $BP = BQ$
- c. $CQ = CR$
- d. None of these

Q3. If $DR = 7$ cm and $AD = 11$ cm, then $AP =$

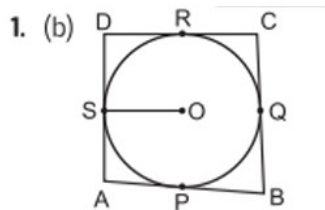
- a. 4 cm
- b. 18 cm
- c. 7 cm
- d. 11 cm

Q4. If O is the centre of the fountain, with $\angle QCR = 60^\circ$, then $\angle QOR =$

- a. 60°
- b. 120°
- c. 90°
- d. 30°

Q5. Which of the following is correct?

- a. $AB + BC = CD + DA$
- b. $AB + AD = BC + CD$
- c. $AB + CD = AD + BC$
- d. All of these



Here, OS the is radius of circle.

Since, radius at the point of contact is perpendicular to tangent.

So, $\angle OSA = 90^\circ$

So, option (b) is correct.

2. (d) Since, length of tangents drawn from an external point to a circle are equal.

.. $AS = AP$, $BP = BQ$,

$CQ = CR$ and $DR = DS$... (1)

So, option (d) is correct.

3. (a) $AP = AS$ $AD - DS = AD - DR$ (using eq. (1))

$= 11 - 7 = 4$ cm

So, option (a) is correct.

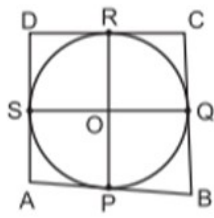
4. (b) In quadrilateral OQCR, $\angle QCR = 60^\circ$ (Given)

And $\angle OQC = \angle ORC = 90^\circ$

(Since, radius at the point of contact is perpendicular to tangent.)

$\angle QOR = 360^\circ - 90^\circ - 90^\circ - 60^\circ$

So, option (b) is correct.



5. (c) From eq. (1), we have $AS = AP$, $DS = DR$,
 $BQ = BP$ and $CQ = CR$

Adding all above equations, we get

$$AS + DS + BQ + CQ = AP + DR + BP + CR$$

$$= AD + BC = AB + CD$$

So, option (c) is correct.

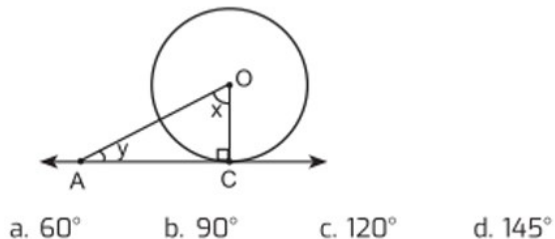
Case Study 2

For class 10 students, a teacher planned a game for the revision of chapter circles with some questions written on the board, which are to be answered by the students. For each correct answer, a student will get a reward. Some of the questions are given below.



Based on the given information, solve the following questions:

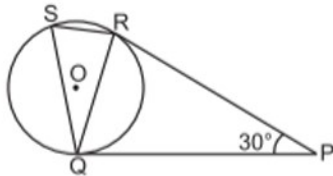
Q1. In the given figure, $x + y =$



Q2. If PA and PB are two tangents drawn to a circle with centre O from P such that $\angle PBA = 50^\circ$, then $\angle OAB =$

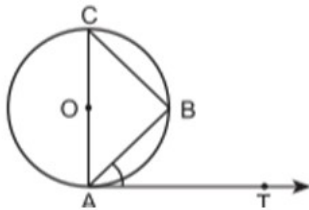
- a. 50°
- b. 25°
- c. 40°
- d. 130°

Q3. In the given figure, PQ and PR are two tangents to the circle, then $\angle ROQ =$



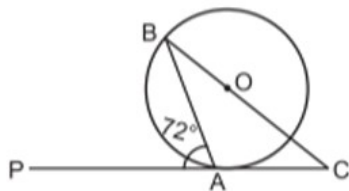
- a. 30°
- b. 60°
- c. 105°
- d. 150°

Q4. In the given figure, AB is a chord of the circle and AOC is its diameter such that $\angle ACB = 55^\circ$, then $\angle BAT =$



- a. 35°
- b. 55°
- c. 125°
- d. 110°

Q5. In the given figure, if PC is the tangent at A of the circle with $\angle PAB = 72^\circ$ and $\angle AOB = 132^\circ$, then $\angle ABC =$



- a. 18°
- b. 30°
- c. 60°
- d. Can't be determined

Solutions

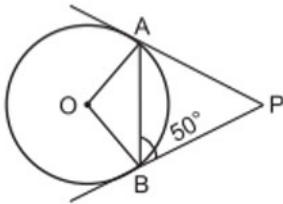
1. (b) In $\triangle OAC$, $\angle OCA = 90^\circ$

Since, radius at the point of contact is perpendicular to tangent.

$$\therefore \angle OAC + \angle AOC = 90^\circ = x + y = 90^\circ$$

So, option (b) is correct.

2. (c)



Since, $OB \perp PB$ (since, radius at the point of contact is perpendicular to tangent)
and $\angle PBA = 50^\circ$ (Given)

$$\angle OBA = 90^\circ - 50^\circ = 40^\circ$$

Also, $OA = OB$

$$\therefore \angle OAB = \angle OBA = 40^\circ$$

(radii of circle)

(angle opposite to equal sides are equal)

So, option (c) is correct.

3. (d) In quadrilateral OQPR,

$$\angle ROQ + \angle RPQ = 180^\circ$$

(Angle between the two tangents drawn from an external point to a circle is

supplementary to the angle subtended by the line segment joining the point of contact at the centre)

$$\therefore \angle ROQ = 180^\circ - 30^\circ = 150^\circ$$

So, option (d) is correct.

4. (b) Here, $\angle ABC = 90^\circ$ (angle in a semicircle)

Now, In $\triangle ABC$,

$$\angle BAC + \angle ACB + \angle ABC = 180^\circ$$

(by angle sum property of triangle)

$$\Rightarrow \angle BAC + 55^\circ + 90^\circ = 180^\circ$$

$$\Rightarrow \angle BAC = 180^\circ - 145^\circ = 35^\circ$$

Also, $\angle OAT = 90^\circ$ (radius at the point of contact is perpendicular to tangent)

$$\Rightarrow \angle BAT + \angle OAB = 90^\circ$$

$$\Rightarrow \angle BAT = 90^\circ - 35^\circ \quad (\because \angle CAB = \angle OAB)$$

$$= 55^\circ$$

So, option (b) is correct.

5. (b) Here, $\angle PAB = 72^\circ$

$\therefore \angle OAP = 90^\circ$ ($\because OA \perp AP$)

$\angle OAB + \angle PAB = 90^\circ$

$= \angle OAB = 90^\circ - 72^\circ = 18^\circ$

Also, $\angle AOB = 132^\circ$ (given)

Now in $\triangle OAB$,

$\angle ABO + \angle BAO + \angle AOB = 180^\circ$

(by angle sum property of triangle)

$\angle ABO = 180^\circ - 132^\circ - 18^\circ = 30^\circ$

$\therefore \angle ABC + \angle ABO = 30^\circ$

So, option (b) is correct.