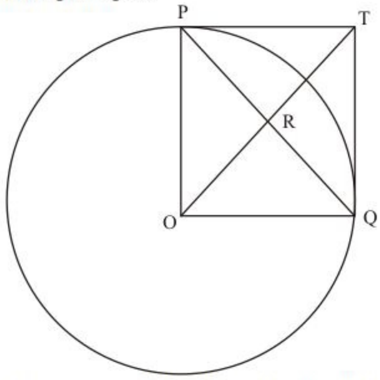
Circles Ex 10.2 Q24

Answer :

In the given figure,



PO = OQ (Since they are the radii of the same circle)

PT = *TQ* (Length of the tangents from an external point to the circle will be equal) Now considering the angles of the quadrilateral PTQO, we have,

$\angle POQ = 90°$ (Given in the problem)

$\angle OPT = 90°$ (The radius of the circle will be perpendicular to the tangent at the point of contact)

$\angle TQO = 90°$ (The radius of the circle will be perpendicular to the tangent at the point of contact)

We know that the sum of all angles of a quadrilateral will be equal to $360°$. Therefore,

$\angle POQ + \angle TQO + \angle OPT + \angle PTQ = 360°$

$90° + 90° + 90° + \angle PTQ = 360°$

$\angle PTQ = 90°$

Thus we have found that all angles of the quadrilateral are equal to 90°.

Since all angles of the quadrilateral *PTQO* are equal to 90° and the adjacent sides are equal, this quadrilateral is a square.

We know that in a square, the diagonals will bisect each other at right angles.

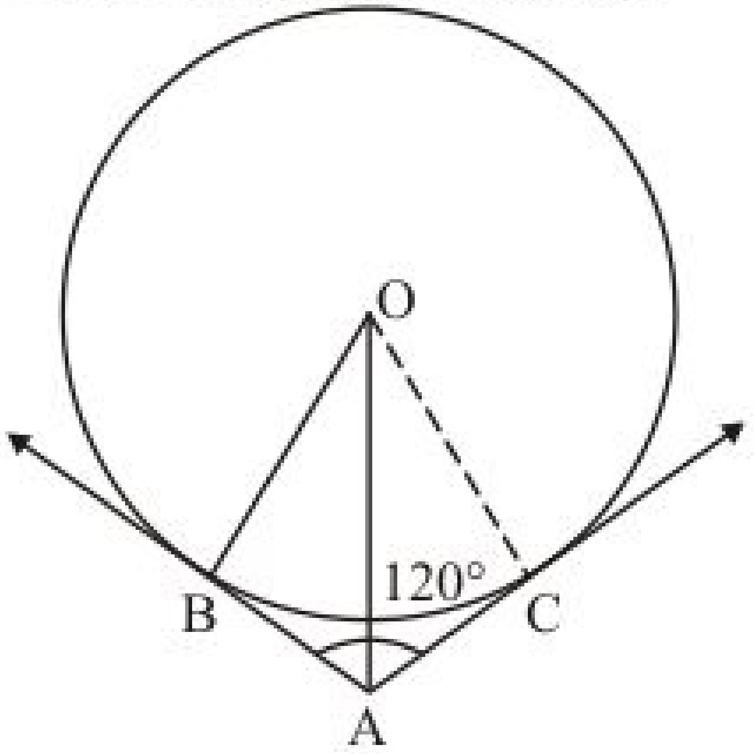
Therefore, *PQ* and *OT* bisect each other at right angles.

Thus we have proved.

Circles Ex 10.2 Q25

Answer :

Consider ΔOAB and ΔOAC.



We have,

$OB = OC$ (Since they are radii of the same circle)

$AB = AC$ (Since length of two tangents drawn from an external point will be equal)

OA is the common side.

Therefore by SSS congruency, we can say that ΔOAB and ΔOAC are congruent triangles.

Therefore,

$\angle OAB = \angle OAC$

It is given that,

$\angle OAB + \angle OAC = 120°$

$2\angle OAB = 120°$

$\angle OAB = 60°$

We know that,

$\cos \angle OAB = \frac{AB}{OA}$

$\cos 60° = \frac{AB}{OA}$

We know that,

$\cos 60° = \frac{1}{2}$

Therefore,

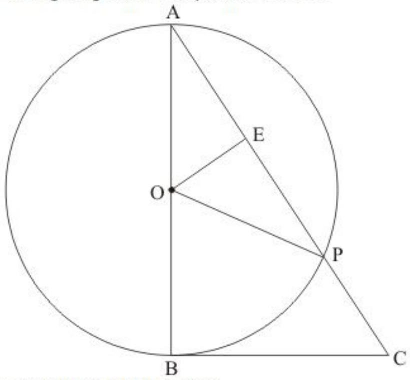
$\frac{1}{2} = \frac{AB}{OA}$

$OA = 2AB$

Circles Ex 10.2 Q26

Answer :

The figure given in the question is below



Let us first take up ΔAOP.

We have,

$OA = OP$ (Since they are the radii of the same circle)

Therefore, ΔAOP is an isosceles triangle. From the property of isosceles triangle, we know that, when a median drawn to the unequal side of the triangle will be perpendicular to the unequal side.

Therefore,

$\angle OEA = 90°$

Now let us take up ΔAOE and ΔABC.

We know that the radius of the circle will always be perpendicular to the tangent at the point of contact. In this problem, OB is the radius and BC is the tangent and B is the point of contact.

Therefore,

$\angle ABC = 90°$

Also, from the property of isosceles triangle we have found that

$\angle OEA = 90°$

Therefore,

$\angle ABC = \angle OEA$

$\angle A$ is the common angle to both the triangles.

Therefore, from AA postulate of similar triangles,

$\Delta AOE \sim \Delta ABC$

Thus we have proved.

*********** END **********