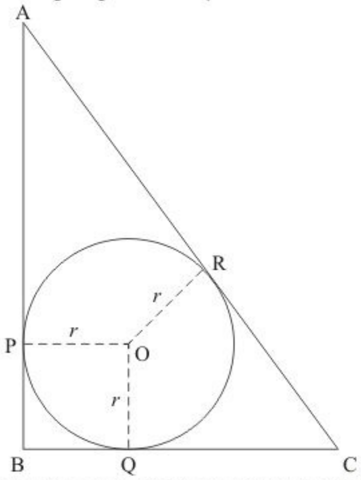
Circles Ex 10.2 Q15

Answer :

The figure given in the question is below.



From the property of tangents we know that, the length of two tangents drawn from the same external point will be equal. Therefore we have the following,

$SA = AP$

For our convenience, let us represent SA and AP by a

$PB = BQ$

Let us represent PB and BQ by b

$QC = CR$

Let us represent QC and CR by c

$DR = DS$

Let us represent DR and DS by d

It is given in the problem that,

$AB = 6$

By looking at the figure we can rewrite the above equation as follows,

$AP + PB = 6$

$a + b = 6$

$b = 6 - a$ ...... (1)

Similarly we have,

$BC = 7$

$BQ + QC = 7$

$b + c = 7$

Let us substitute the value of b which we have found in equation (1). We have,

$6 - a + c = 7$

$c = a + 1$ ...... (2)

$CD = 4$

$CR + RD = 4$

$c + d = 4$

Let us substitute the value of c which we have found in equation (2).

$a + 1 + d = 4$

$a + d = 3$

As per our representations in the previous section, we can write the above equation as follows,

$SA + DS = 3$

By looking at the figure we have,

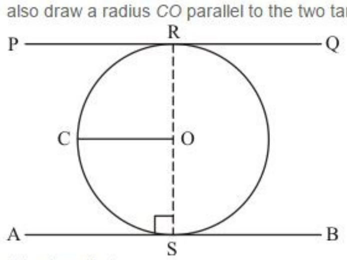
$AD = 3$

Thus we have found that length of side AD is 3 cm.

Circles Ex 10.2 Q16

Answer :

Let us first put the given data in the form of a diagram. Let us also draw another parallel tangent *PQ* parallel to the given tangent *AB*. Draw a radius *OR* to the point of contact of the tangent *PQ*. Let us also draw a radius *CO* parallel to the two tangents.



It is given that,

$\angle OSA = 90°$

We know that sum of angles on the same side of the transversal will be equal to 180°. Therefore,

$$\angle OSA + \angle COS = 180°$$
$$90° + \angle COS = 180°$$
$$\angle COS = 90° \qquad \ldots\ldots(1)$$

We know that the radius of the circle will always be perpendicular to the tangent at the point of contact. Therefore,

$\angle PRO = 90°$

Again, since sum of angles on the same side of the transversal is equal to 180°, we have,

$$\angle PRO + \angle COP = 180°$$
$$90° + \angle COP = 180°$$
$$\angle COP = 90° \qquad \ldots\ldots(2)$$

Now let us add equation (1) and (2). We get,

$$\angle COS + \angle COP = 90° + 90°$$
$$\angle COS + \angle COP = 180°$$

Looking at the figure we can rewrite the above equation as,

$\angle ROS = 180°$

We know that the angle of a straight line will measure 180°. Therefore, *ROS* is the straight line. Also, *RO* is the radius which we have drawn and we know that a radius is always drawn from the centre of the circle. Therefore, line *ROS* passes through the centre of the circle.

Thus we have proved that the perpendicular to the tangent at the point of contact passes through the centre of the circle.

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