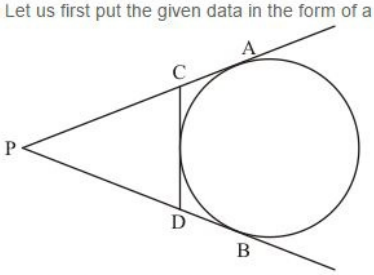
Circles Ex 10.2 Q10

Answer :

Let us first put the given data in the form of a diagram.



It is given that PA = 14cm. we have to find the perimeter of $\triangle PCD$.
Perimeter of $\triangle PCD$ is *PC* + *CD* + *PD*
Looking at the figure we can rewrite the equation as follows.
Perimeter of $\triangle PCD$ is *PC* + *CE* + *ED* + *PD* .....(1)
From the property of tangents we know that the length of two tangents drawn to a circle from the same external point will be equal. Therefore,
CE =*CA*
ED =*DB*
Replacing the above in equation (1), we have,
Perimeter of $\triangle PCD$ as *PC* + *CA* + *DB* + *PD*
By looking at the figure we get,
PC +*CA* =*PA*
PC +*CA* =*PA*
DB +*PD* =*PB*
Therefore,
Perimeter of $\triangle PCD$ is *PA* + *PB*
It is given that PA = 14 cm. again from the same property of tangents which says that the length of two tangents drawn to a circle from the same external point will be equal, we have,
PA = *PB*
Therefore,
Perimeter of $\triangle PCD$ = 2*PA*
Perimeter of $\triangle PCD$ = 2 × 14
Perimeter of $\triangle PCD$ = 28
Thus perimeter of $\triangle PCD$ is 28 cm.

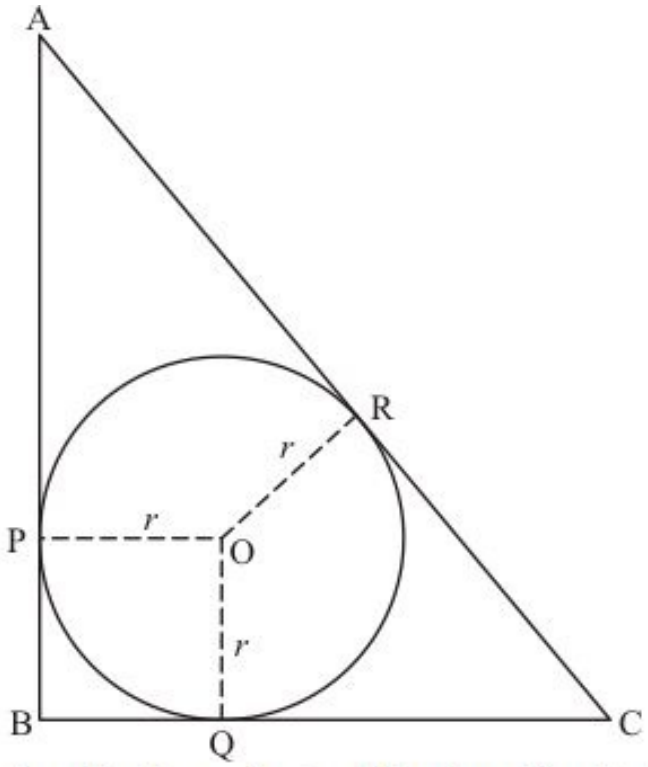
Circles Ex 10.2 Q11

Answer :

From the property of tangents we know that the length of two tangents drawn to a circle from the same external point will be equal. Therefore, we have
BQ = *BP*
Let us denote *BP* and *BQ* by *x*
AP = *AR*
Let us denote *AP* and *AR* by *y*
RC = *QC*
Let us denote *RC* and *RQ* by *z*

We have been given that $\triangle ABC$ is a right triangle and *BC* = 6 cm and *AB* = 8 cm. let us find out *AC* using Pythagoras theorem. We have,

$$AC^2 = AB^2 + BC^2$$
$$AC^2 = 6^2 + 8^2$$
$$AC^2 = 36 + 64$$
$$AC^2 = 100$$
$$AC = \sqrt{100}$$
$$AC = 10$$



Consider the perimeter of the given triangle. We have,

$AB + BC + AC = 8 + 6 + 10$

$AB + BC + AC = 24$

Looking at the figure, we can rewrite it as,

$AP + PB + BQ + QC + AR + RC = 24$

Let us replace the sides with the respective x, y and z which we have decided to use.

$$y + x + x + z + y + z = 24$$
$$2x + 2y + 2z = 24$$
$$2(x + y + z) = 24$$
$$x + y + z = 12 \qquad .....(1)$$

Now, consider the side AC of the triangle.

$AC = 10$

Looking at the figure we can say,

$AR + RC = 10$

$y + z = 10$ ..... (2)

Now let us subtract equation (2) from equation (1). We have,

$x + y + z = 12$

$y + z = 10$

After subtracting we get,

$x = 2$

That is,

$BQ = 2$, and

$BP = 2$

Now consider the quadrilateral $BPOQ$. We have,

$BP = BQ$ (since length of two tangents drawn to a circle from the same external point are equal)

Also,

$PO = OQ$ (radii of the same circle)

It is given that $\angle PBQ = 90^\circ$.

From the property of tangents, we know that the tangent will be at right angle to the radius of the circle at the point of contact. Therefore,

$\angle OPB = 90^\circ$

$\angle OQB = 90^\circ$

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

$$\angle PBQ + \angle OPB + \angle OQB + \angle POQ = 360^\circ$$
$$90^\circ + 90^\circ + 90^\circ + \angle POQ = 360^\circ$$
$$270^\circ + \angle POQ = 360^\circ$$
$$\angle POQ = 90^\circ$$

Since all the angles of the quadrilateral are equal to 90° and the adjacent sides also equal, this quadrilateral is a square. Therefore, all sides will be equal. We have found out that,

BP = 2 cm

Therefore, the radii

PO = 2 cm

Thus the radius of the incircle of the triangle is 2 cm.

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