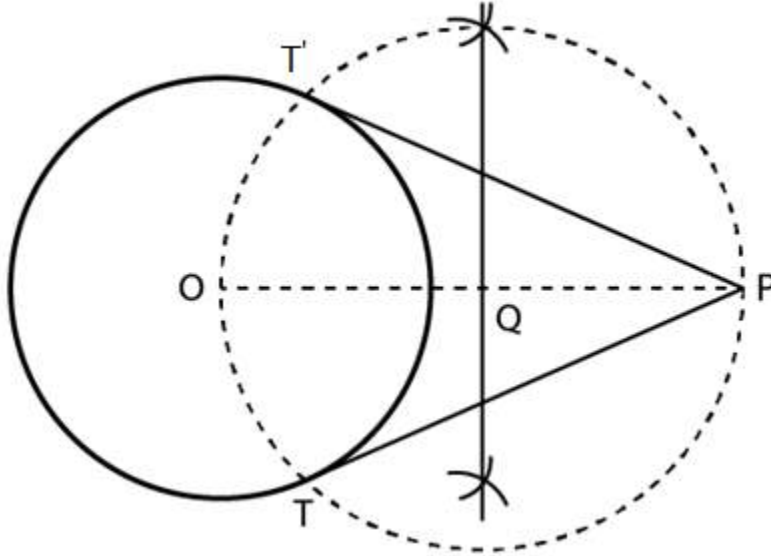


Exercise 11.3

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1. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct a pair of tangents to the circle and measure their lengths.

Solution:



Steps of construction:

1. Firstly, we draw a circle with centre O and radius 6 cm.
2. Mark a point P at a distance of $OP = 10$ cm, and join OP.
3. Draw a right bisector of OP, intersecting OP at Q.
4. Now, taking Q as centre and radius $OQ = PQ$, draw a circle to intersect the given circle at T and T'.
5. Join PT and PT' to obtain the required tangents.

Thus, PT and PT' are the required tangents.

To find the length of the tangents.

We know that $OT \perp PT$ and $\triangle OTP$ is the right triangle.

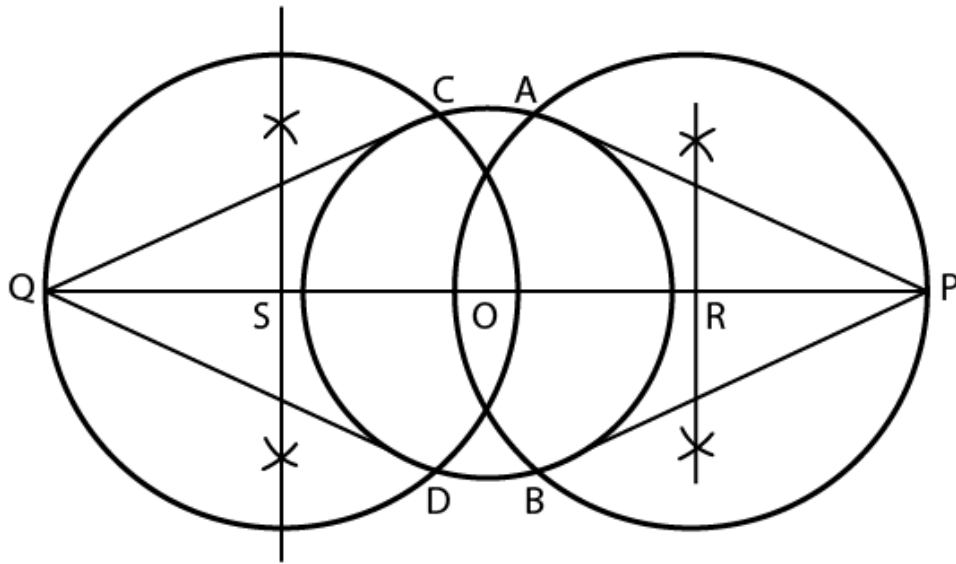
Therefore, $OT = 6$ cm (radius) and $PO = 10$ cm.

$$\begin{aligned}
 \text{So, in } \triangle OTP, \\
 PT^2 &= OP^2 - OT^2 \text{ [By Pythagoras theorem]} \\
 &= (10)^2 - (6)^2 \\
 &= 100 - 36 \\
 &= 64 \\
 &= 8 \text{ cm}
 \end{aligned}$$

Therefore, the length of tangents is 8 cm each.

2. Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these points P and Q.

Solution:

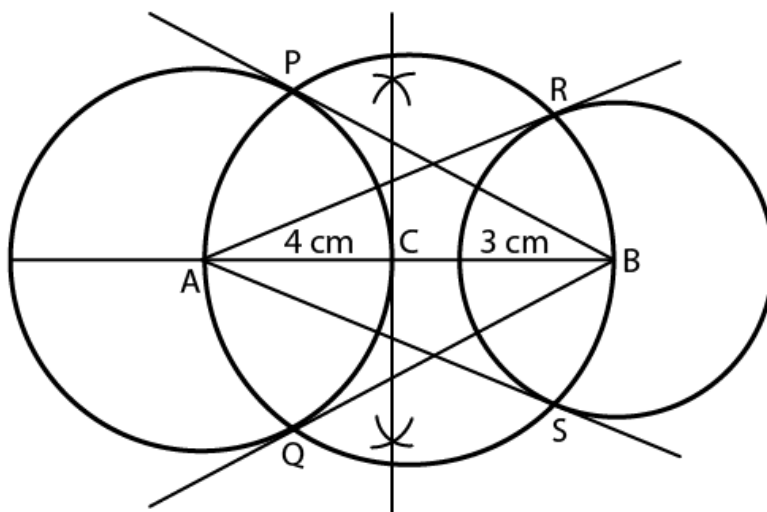


Steps of construction:

1. Draw a line segment PQ of 14 cm.
2. Now, mark the midpoint O of PQ.
3. Draw the perpendicular bisectors of PO and OQ which intersects at points R and S on PQ.
4. With centre R and radius RP draw a circle.
5. With centre S and radius, SQ draw a circle.
6. And now, with centre O and radius 3 cm draw another circle which intersects the previous circles at the points A, B, C, and D.
7. Finally, join PA, PB, QC and QD. Thus, PA, PB, QC, and QD are the required tangents.

3. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as the centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

Solution:



Steps of construction:

1. Draw a line segment $AB = 8$ cm.
 2. Draw the perpendicular of AB which intersects it at C .
 3. With the centre, C and radius CA draw a circle.
 4. Now, with A & B as centres and radii 4 cm and 3 cm respectively, draw two circles which intersects the previous circles at the points P, Q, R and S .
 5. Finally, join AR, AS, BP and BQ .
- Thus, AR, AS, BP and BQ are the required tangents.

