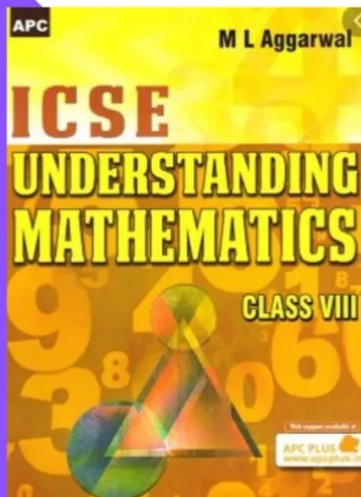


ML Aggarwal Solutions for Class 8 Maths

Chapter 15- Circle



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ML Aggarwal Solutions

CLASS 8 MATHS

Chapter 15: Circle

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Chapter 15- Circle

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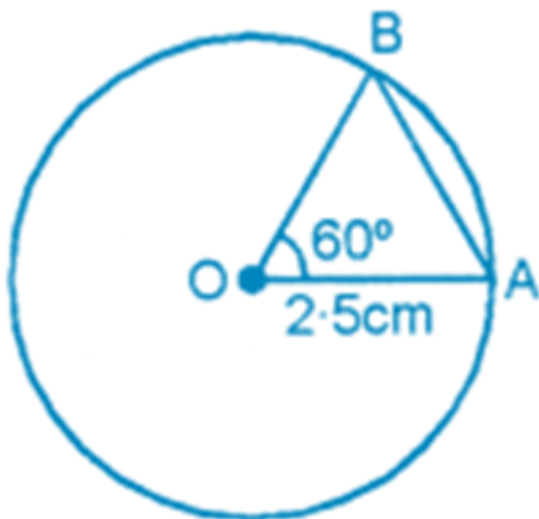
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ML Aggarwal 8th Maths Chapter 15, Class 8 Maths Chapter 15 solutions

1. Draw a circle with centre O and radius 2.5 cm. Draw two radii OA and OB such that $\angle AOB = 60^\circ$. Measure the length of the chord AB.

Solution:

1. Draw a circle, taking centre as O and radius equal to 2.5 cm
2. Join OA, where A is any point on the circle
3. Draw $\angle AOB$ equal to 60°
4. Now, join AB and on measuring we get, $AB = 2.5$ cm

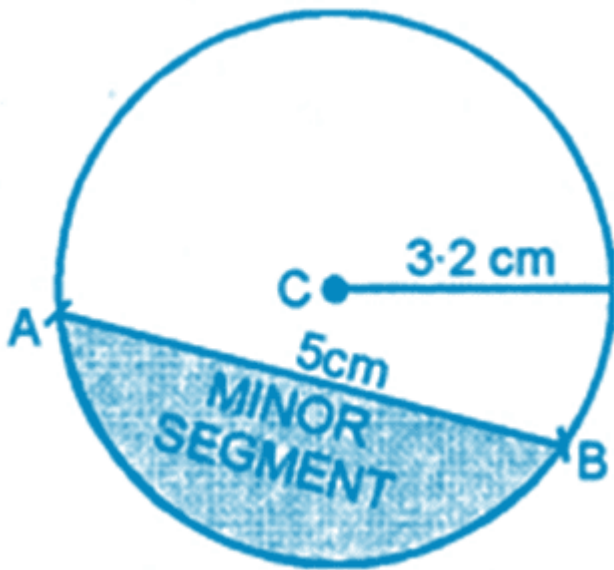


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2. Draw a circle of radius 3.2 cm. Draw a chord AB of this circle such that $AB = 5$ cm. Shade the minor segment of the circle.

Solution:

1. Draw a circle, taking centre as O and radius = 3.2 cm
2. Take a point A on the circle
3. Taking A as centre and radius = 5 cm, draw an arc to meet the circle at point B
4. Now, join AB and shade the minor segment of the circle



3. Find the length of the tangent drawn to a circle of radius 3 cm, from a point at a distance 5 cm from the centre.

Solution:

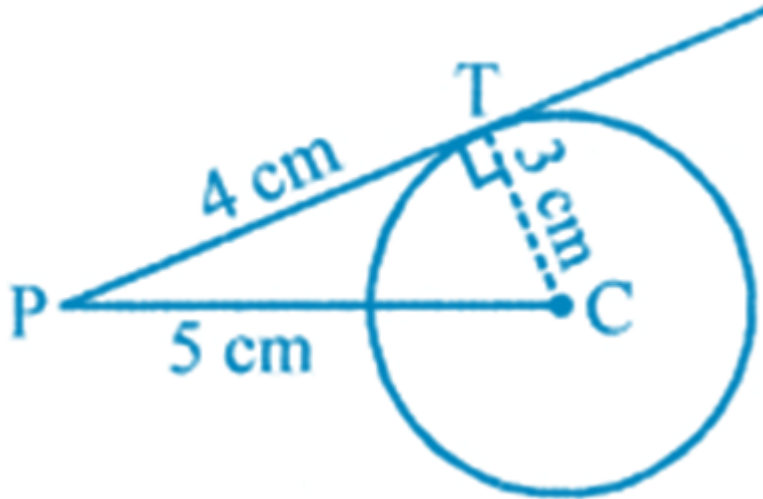
Draw a circle, taking C as centre and radius $CT = 3$ cm

Let PT be the tangent, drawn from point P to a circle with centre C

Let $CP = 5$ cm

$CT = 3$ cm (given)

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$\angle CTP = 90^\circ$ (since radius is perpendicular to tangent)

From $\triangle CPT$,

$CP^2 = PT^2 + CT^2$ (By Pythagoras theorem)

$$(5)^2 = PT^2 + (3)^2$$

We get,

$$PT^2 = 25 - 9$$

$$PT^2 = 16$$

$$PT = \sqrt{16}$$

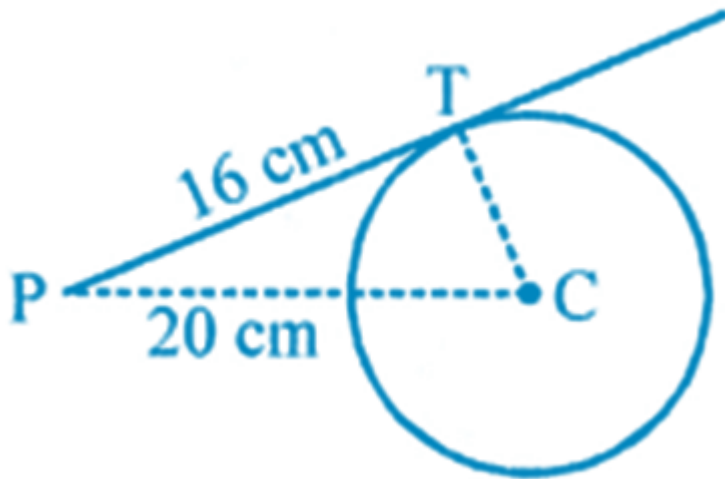
We get,

$$PT = 4$$

Therefore, length of tangent = 4 cm

4. In the adjoining figure, PT is a tangent to the circle with centre C. Given $CP = 20$ cm and $PT = 16$ cm, find the radius of the circle.

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**Solution:**

We know that,

Radius is always perpendicular to tangent

i.e, $CT \perp PT$

Therefore,

$\triangle CPT$ is a right angled triangle, where CP = hypotenuse

In right angled triangle,

By Pythagoras theorem, we get,

$$CP^2 = PT^2 + CT^2$$

$$CT^2 = CP^2 - PT^2$$

$$CT^2 = (20)^2 - (16)^2$$

We get,

$$CT^2 = 400 - 256$$

$$CT^2 = 144$$

$$CT = \sqrt{144}$$

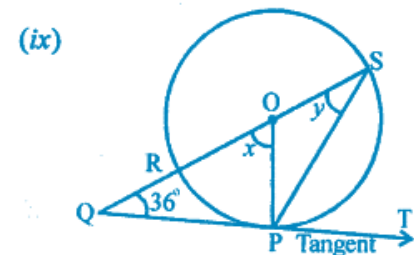
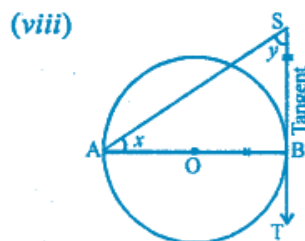
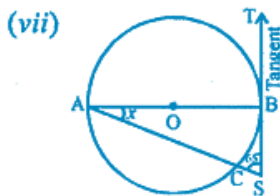
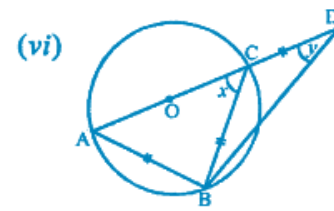
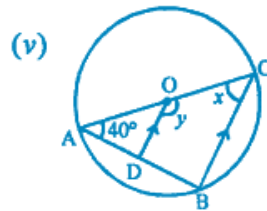
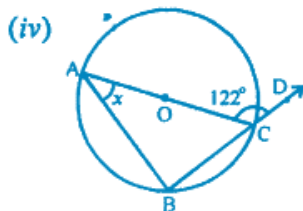
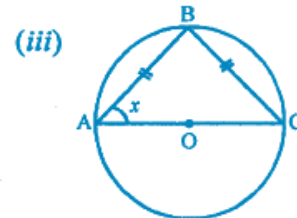
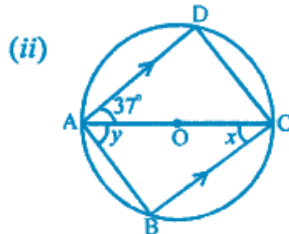
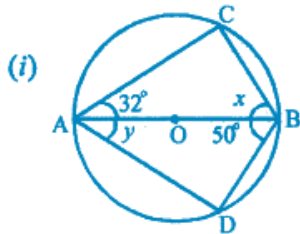
We get,

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CT = 12 cm

Therefore, radius of circle = 12 cm

5. In each of the following figure, O is the centre of the circle. Find the size of each lettered angle:



Solution:

(i) In the given figure,

AB is the diameter and O is the centre of the circle

Given $\angle CAB = 32^\circ$

$\angle ABD = 50^\circ$

$\angle C = 90^\circ$ (angles in the semicircle)

By angle sum property of triangle, we get,

$\angle C + \angle CAB + \angle ABC = 180^\circ$

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$$90^{\circ} + \angle CAB + \angle x = 180^{\circ}$$

$$90^{\circ} + 32^{\circ} + \angle x = 180^{\circ}$$

$$32^{\circ} + \angle x = 180^{\circ} - 90^{\circ}$$

We get,

$$\angle x = 90^{\circ} - 32^{\circ}$$

$$\angle x = 58^{\circ}$$

Similarly,

In right angled triangle ADB,

By angle sum property of triangle, we get,

$$\angle ABD + \angle D + \angle BAD = 180^{\circ}$$

$$50^{\circ} + 90^{\circ} + \angle BAD = 180^{\circ}$$

$$50^{\circ} + 90^{\circ} + \angle y = 180^{\circ}$$

$$\angle y = 180^{\circ} - 140^{\circ}$$

We get,

$$\angle y = 40^{\circ}$$

(ii) In the figure,

AC is the diameter of circle with centre O

$$\angle DAC = 37^{\circ}$$

AD $\parallel$ BC

$$\angle ACB = \angle DAC \text{ (Alternate angles)}$$

Hence,

$$x = 37^{\circ}$$

In $\triangle ABC$,

$$\angle B = 90^{\circ} \text{ (Angle in a semicircle)}$$

By angle sum property of triangle, we get,

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$$\angle x + \angle y + \angle B = 180^\circ$$

$$37^\circ + \angle y + 90^\circ = 180^\circ$$

$$\angle y = 180^\circ - 127^\circ$$

We get,

$$\angle y = 53^\circ$$

(iii) In the figure,

AC is the diameter of the circle with center as O

$$BA = BC$$

Hence,

$$\angle BAC = \angle BCA \text{ (angles of isosceles triangle)}$$

$$\text{But } \angle ABC = 90^\circ \text{ (angles in a semicircle)}$$

In triangle ABC,

By angle sum property of triangle, we get,

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

$$\angle BAC + \angle BCA = 180^\circ - 90^\circ$$

$$\angle x + \angle x = 90^\circ$$

$$\angle 2x = 90^\circ$$

We get,

$$\angle x = 45^\circ$$

(iv) In the figure,

AC is the diameter of the circle, with centre as O,

$$\angle ACD = 122^\circ$$

$$\angle ACB + \angle ACD = 180^\circ \text{ (Linear pair)}$$

$$\angle ACB + 122^\circ = 180^\circ$$

$$\angle ACB = 180^\circ - 122^\circ$$

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We get,

$$\angle ACB = 58^\circ$$

In $\triangle ABC$,

$$\angle ABC = 90^\circ \text{ (Angles in a semicircle)}$$

By angle sum property of triangle, we get,

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

$$90^\circ + x + 58^\circ = 180^\circ$$

$$x = 180^\circ - 148^\circ$$

We get,

$$x = 32^\circ$$

(v) In the figure,

AC is the diameter of the circle, with centre as O,

$$OD \parallel CB \text{ and } \angle CAB = 40^\circ$$

In $\triangle ABC$,

$$\angle B = 90^\circ \text{ (Angle in a semicircle)}$$

By angle sum property of triangle, we get,

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

$$\angle BCA + \angle BAC + 90^\circ = 180^\circ$$

$$\angle BCA + \angle BAC = 180^\circ - 90^\circ$$

$$\angle BCA + \angle BAC = 90^\circ$$

$$x + 40^\circ = 90^\circ$$

$$x = 90^\circ - 40^\circ$$

We get,

$$x = 50^\circ$$

$$\therefore OD \parallel CB$$

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Hence,

$$\angle AOD = \angle BCA \text{ (corresponding angles)}$$

$$\angle AOD = 50^\circ$$

$$\text{But } \angle AOD + \angle DOC = 180^\circ \text{ (Linear pair)}$$

$$50^\circ + y = 180^\circ$$

$$y = 180^\circ - 50^\circ$$

We get,

$$y = 130^\circ$$

$$\text{Therefore, } x = 50^\circ \text{ and } y = 130^\circ$$

(vi) In the figure,

AC is the diameter of the circle with centre as O

$$BA = BC = CD$$

In $\triangle ABC$,

$$\angle ABC = 90^\circ \text{ (Angle in a semicircle)}$$

By angle sum property of triangle, we get,

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

$$\angle BAC + \angle BCA + 90^\circ = 180^\circ$$

$$\angle BAC + \angle BCA = 90^\circ$$

But given that, $BA = BC$

$$\text{Therefore, } \angle BAC = \angle BCA = x$$

$$x + x = 90^\circ$$

$$2x = 90^\circ$$

$$x = 45^\circ$$

In $\triangle BCD$,

$$BC = CD$$

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Hence,

$$\angle CBD = \angle CDB = y \text{ and}$$

Exterior $\angle ACB =$ Sum of interior opposite angles

$$\angle ACB = \angle CBD + \angle CDB$$

$$x = y + y$$

Therefore,

$$2y = x = 45^\circ$$

$$y = 45^\circ / 2$$

$$y = 22.5^\circ \text{ or}$$

$$y = ($$

$$22\frac{1}{2})^\circ$$

(vii) In the figure,

AB is the diameter of circle with centre O

ST is the tangent at point B

$$\angle ASB = 65^\circ$$

In $\triangle ABS$

∵ TS is the tangent and OB is the radius

OB is perpendicular to ST or

$$\angle ABS = 90^\circ$$

But in $\triangle ASB$,

$$\angle BAC + \angle ASB + \angle ABS = 180^\circ$$

$$x + 65^\circ + 90^\circ = 180^\circ$$

$$x + 155^\circ = 180^\circ$$

$$x = 180^\circ - 155^\circ$$

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We get,

$$x = 25^{\circ}$$

Therefore, $x = 25^{\circ}$

(viii) In the figure,

AB is the diameter of the circle with centre O

ST is the tangent to the circle at point B

$$AB = BS$$

Hence,

ST is the tangent and OB is the radius

$$OB \perp ST \text{ or } \angle OBS = 90^{\circ}$$

In $\triangle ABS$,

$$\angle BAS + \angle BSA + \angle ABS = 180^{\circ}$$

By angle sum property of triangle

$$\angle BAS + \angle BSA + 90^{\circ} = 180^{\circ}$$

$$\angle BAS + \angle BSA = 90^{\circ}$$

$$x + y = 90^{\circ}$$

$$\therefore AB = BS$$

Hence,

$$x = y$$

$$\text{Therefore, } x = y = 90^{\circ} / 2 = 45^{\circ}$$

(ix) In the figure,

RS is the diameter of the circle with centre as O

SR is produced to Q

QT is the tangent to the circle at point P

OP is joined

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$$\angle Q = 36^\circ$$

QT is the tangent and OP is the radius of the circle

Hence,

OP is perpendicular to QT

$$\angle OPQ = 90^\circ$$

In $\triangle OPQ$,

By angle sum property of triangle, we get,

$$\angle OQP + \angle POQ + \angle OPQ = 180^\circ$$

$$\angle OQP + \angle POQ + 90^\circ = 180^\circ$$

Hence,

$$\angle OQP + \angle POQ = 90^\circ$$

$$36^\circ + x = 90^\circ$$

$$x = 90^\circ - 36^\circ$$

We get,

$$x = 54^\circ$$

In $\triangle OPS$,

OP = OS (Radii of the circle)

Hence,

$$\angle OPS = \angle OSP = y \text{ and}$$

Exterior angle $\angle POQ = \angle OPS + \angle OSP$

$$x = y + y$$

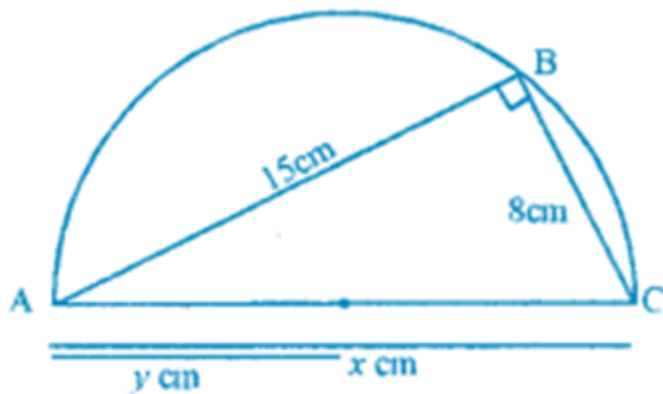
$$x = 2y = 54^\circ$$

6. In each of the following figures, O is the centre of the circle. Find the values of x and

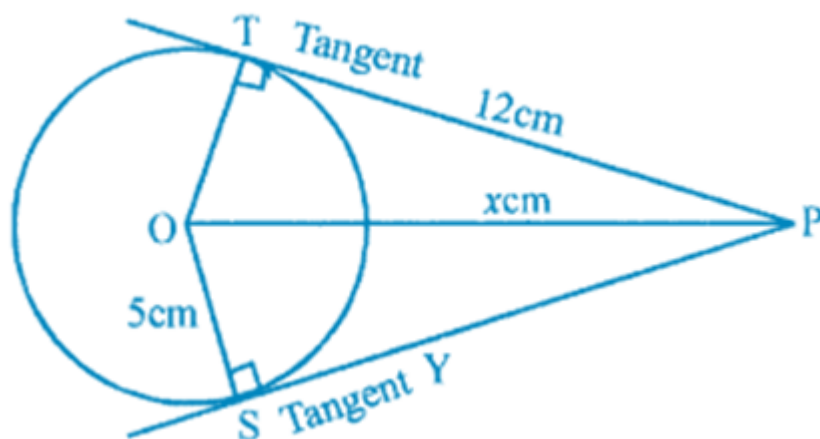
y.

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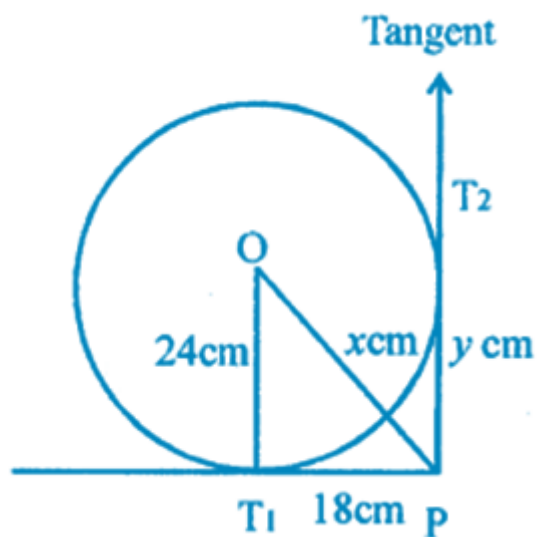
(i)



(ii)



(iii)



Solution:

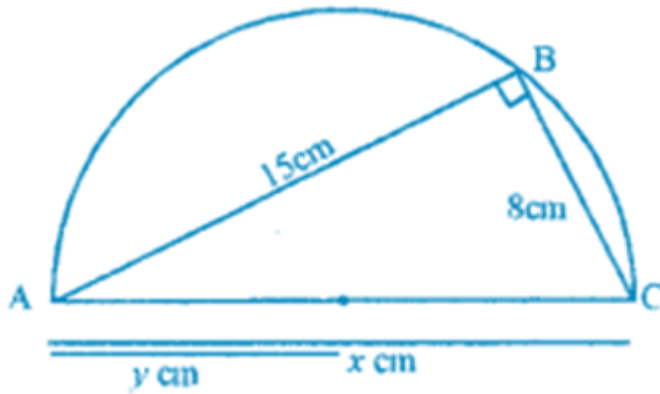
(i) Given

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O is the centre of the circle

AB = 15 cm,

BC = 8 cm



$\angle ABC = 90^\circ$ (Angles in a semicircle)

By Pythagoras Theorem,

$$AC^2 = AB^2 + BC^2$$

$$AC^2 = (15)^2 + (8)^2$$

$$AC^2 = 225 + 64$$

$$AC^2 = 289$$

$$AC^2 = (17)^2$$

$$AC = 17 \text{ cm}$$

$$x = 17 \text{ cm}$$

$$y = 1 / 2$$

(Since AC is the diameter and AO is the radius of the circle)

$$= 1 / 2 \times 17$$

$$= 17 / 2 \text{ cm}$$

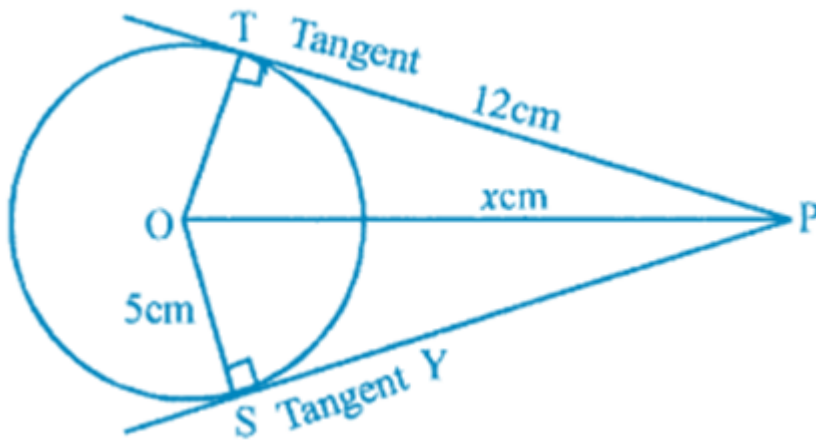
$$= 8.5 \text{ cm}$$

(ii) O is the centre of the circle

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PT and PS are the tangents to the circle from point P

OS and OT are the radii of the circle



Hence, $\angle OSP = \angle OTP = 90^\circ$

$OS = OT = 5 \text{ cm}$ and

$PT = PS = 12 \text{ cm}$

Now,

In right angled triangle OTP,

By Pythagoras Theorem

$$OP^2 = OT^2 + PT^2$$

$$= (5)^2 + (12)^2$$

$$= 25 + 144$$

$$= 169$$

We get,

$$OP^2 = (13)^2$$

Therefore, $OP = 13 \text{ cm}$

i.e, $x = 13 \text{ cm}$

Since $PS = PT = 12 \text{ cm}$

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Therefore,

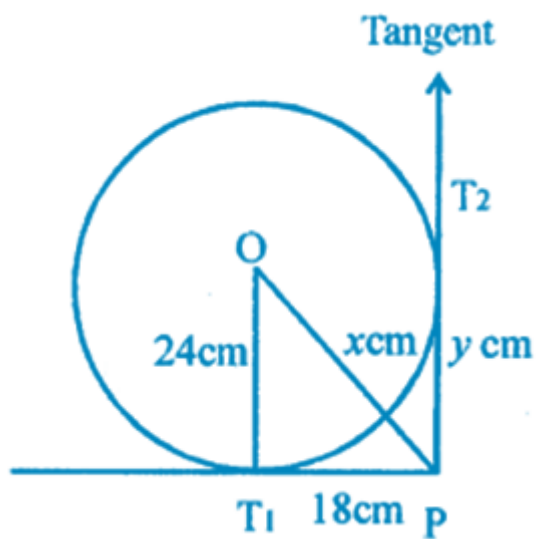
$$y = 12 \text{ cm}$$

(iii) O is the centre of the circle

OT_1 is the radius of the circle

PT_1 and PT_2 are the tangents of the circle from point P

$$OT_1 = 24 \text{ cm and } PT_1 = 18 \text{ cm}$$



Here,

OT_1 is the radius and PT_1 is the tangent,

Hence,

$$OT_1 \perp PT_1$$

Now,

In right angled triangle OPT,

By Pythagoras Theorem

$$OP^2 = OT_1^2 + PT_1^2$$

$$OP^2 = (24)^2 + (18)^2$$

$$OP^2 = 576 + 324$$

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We get,

$$OP^2 = 900$$

$$OP^2 = (30)^2$$

$$OP = 30 \text{ cm}$$

$$x = 30 \text{ cm}$$

Since, PT_1 and PT_2 are the tangents from point P

Therefore,

$$PT_1 = PT_2 = 18 \text{ cm}$$

$$\text{i.e., } y = 18 \text{ cm}$$



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- Chapter 7- Percentage
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About ML Aggarwal

M. L. Aggarwal, is an Indian mechanical engineer, educator. His achievements include research in solutions of industrial problems related to fatigue design. Recipient Best Paper award, Manipal Institute of Technology, 2004. Member of TSTE.

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