CONSTRUCTIONS
PPT-2

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 11
CHAPTER NAME : CONSTRUCTIONS

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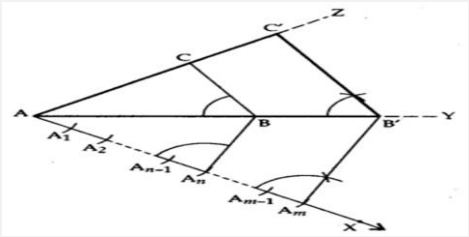
PREVIOUS KNOWLEDGE TEST

Construction of a Triangle Similar to a given Triangle as per given Scale Factor m/n **, m > n.**

Let ΔABC be the given triangle and we want to construct a ΔAB'C', such that each of its sides is mn (m > n) of the corresponding side of ΔABC.



Steps of Construction:

Construct a ΔABC by using the given data.

Make an acute angle ∠BAX, below the base AB. Extend AB to AY and AC to AZ.

Along AX, mark m points A_1, A_2 …, A_n, ..A_m, such that $AA_1 = A_1A_2 = A_2A_3 = \ldots = A_{n-1}A_n = \ldots = A_{m-1}A_m$

Join A_nB.

From A_m, draw A_mB' parallel to A_nB, meeting AY produced at B'.

From B', draw B'C' parallel to BC, meeting AZ produced at C'.

Triangle AB'C' is the required triangle, each of whose sides is (m/n) (m > n) of the corresponding sides of ΔABC.

LEARNING OUTCOME

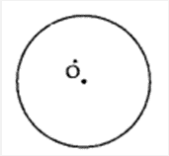
1 . Students will be able to construct the pair of tangents from an external point to a circle.

Construction of tangents to a circle

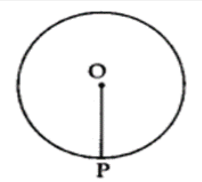
.https://youtu.be/sF2Zj0C_Otw{3.00}

Construction of a Tangent at a Point on a Circle to the Circle when its Centre is Known

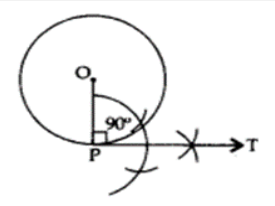
- Draw a circle with centre O of the given radius.



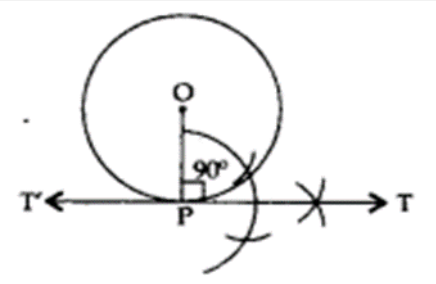
- Take a given point P on the circle.
- Join OP.



- Construct ∠OPT = 90°.



- Produce TP to T' to get TPT' as the required tangent.



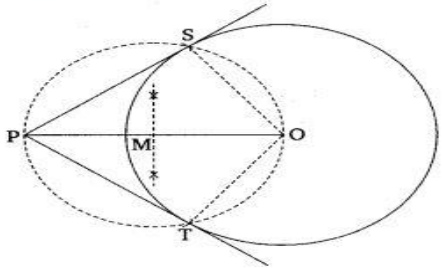
1. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths..

Steps of Construction:

1. Draw a circle with centre and radices = 6 cm.
2. Take a point P such that OP = 10 cm.
3. Draw the perpendicular bisector of OP. Let M is the mid-point of OP.
4. With centre M and radius PM = MO, draw a circle which cuts the given circle at S and T.
5. Join PS and PT.

Thus, PS and PT are the required tangents.

The length of tangents Ps= PT = 8 cm.



Justification:

Join OS.

Now in triangle PSO,

$\angle PSO = 90°$

$\therefore PS = \sqrt{OP^2 - OS^2}$ [By Pythagoras' Theorem]

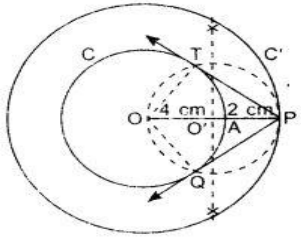
$= \sqrt{(10)^2 - (6)^2} = \sqrt{100 - 36} = \sqrt{64}$

$= 8$ cm.

2. Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length. Also verify the measurement by actual calculation.

Steps of Construction:

1. Draw concentric circles of radius OA = 4 cm and OP = 6 cm having same centre O.
2. Mark these circles as C and C'.
3. Points O, A and P lie on the same line.
4. Draw perpendicular bisector of OP, which intersects OP at O'.
5. Take O' as centre, draw a circle of radius OO' which intersects the circle C at points T and Q.
6. Join PT and PQ, these are the required tangents.
7. Length of these tangents are approx. 4.5 cm.



Justification: Join OT and OQ.

$OT \perp PT$ [Radius $\perp$ to tangent]

In right angled ΔOTP, $OP^2 = OT^2 + PT^2 \Rightarrow (6)^2 = (4)^2 + PT^2$

$\Rightarrow 36 = 16 + PT^2 \Rightarrow 20 = PT^2$

$\Rightarrow PT = \sqrt{20} \Rightarrow PT = 2\sqrt{5}$ cm

Similarly, $PQ = 2\sqrt{5}$ cm

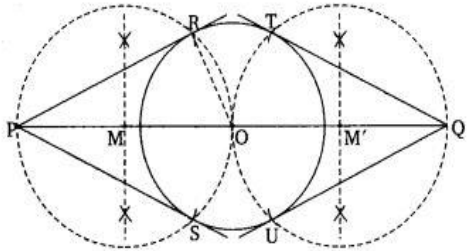
A pair of tangents can be drawn to a circle from an external point outside the circle. These two tangents are equal in lengths.

$\therefore PT = PQ.$

3. 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 two points P and Q.

Steps of Construction:

1. With centre and radius 3 cm, draw a circle.
2. Produce the diameter of circle to both the ends up to P and such that OP = OQ = 7 cm
3. Mark the mid-points M and M' of OP and OQ respectively
4. With centres M and M' and radii MP and MO respectively, draw two circles.



5. Circle with centre M intersects the given circle at Rand S. The circle with centre M intersects the given circle at T and U.
6. Join PR, PS, QT and QU.

Thus, we have PR and PS as a pair of tangents from P and OT and QU as another pair of tangents from Q drawn to the given circle.

HOME ASSIGNMENT:Ex-11.2 Q1 to Q3 AHA

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1. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 120°.

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THANKING YOU

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