EXERCISE 9.2

Write 'True' or 'False' and justify your answer in each of the following:

1. If a chord AB subtends an angle of 60° at the centre of a circle, then angle between the tangents at A and B is also 60°.

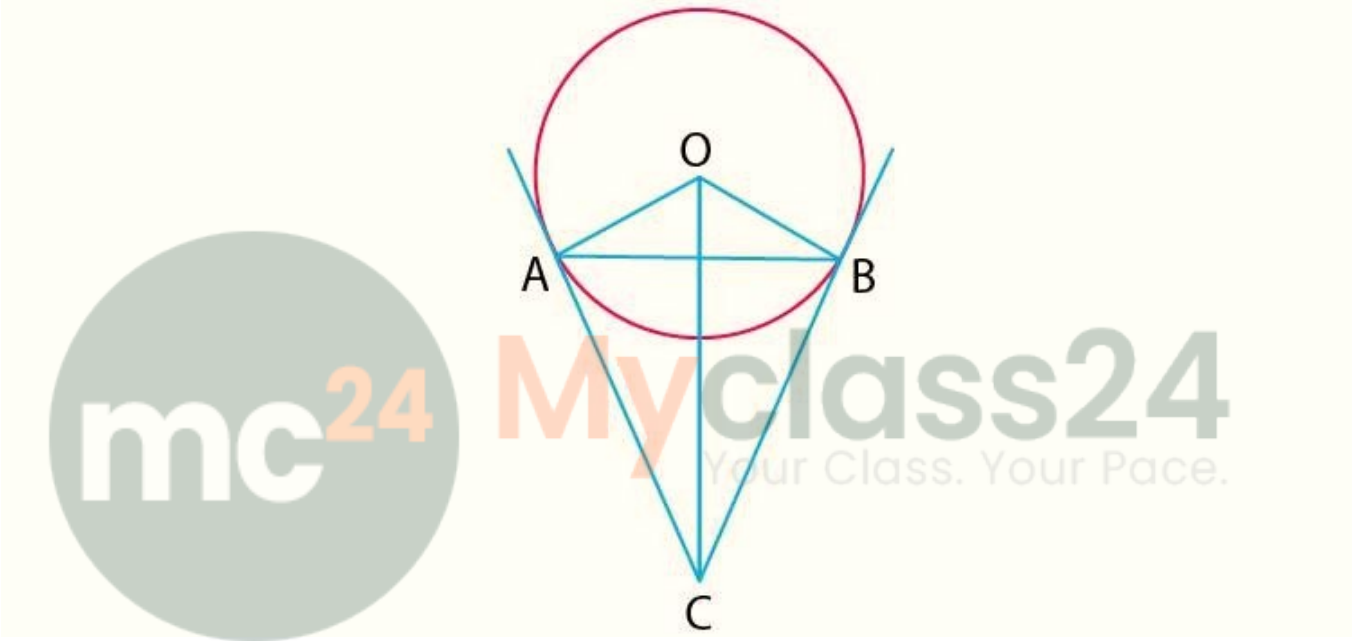
Solution:

False

Justification:

For example,

Consider the given figure. In which we have a circle with centre O and AB a chord with ∠AOB = 60°



Since, tangent to any point on the circle is perpendicular to the radius through point of contact,

We get,

OA ⊥ AC and OB ⊥ CB

∠OBC = ∠OAC = 90° … eq(1)

Using angle sum property of quadrilateral in Quadrilateral AOBC,

We get,

∠OBC + ∠OAC + ∠AOB + ∠ACB = 360°

90° + 90° + 60° + ∠ACB = 360°

∠ACB = 120°

Hence, the angle between two tangents is 120°.

Therefore, we can conclude that,

the given statement is false.

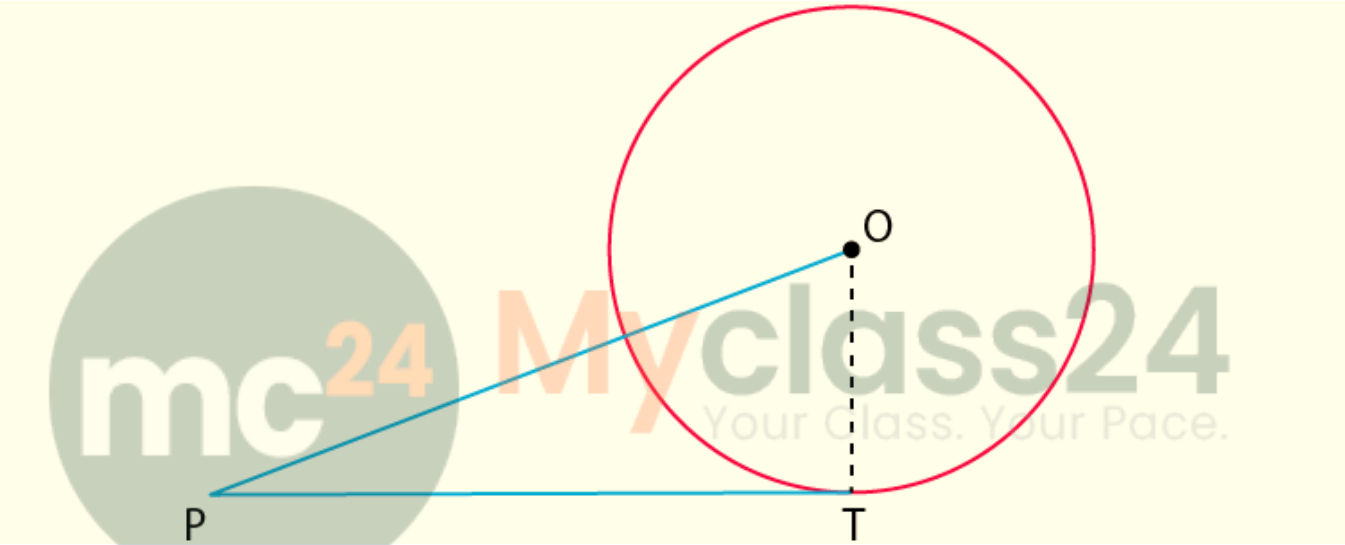
2. The length of tangent from an external point on a circle is always greater than the radius of the circle.

Solution:

False
Justification:
Length of tangent from an external point P on a circle may or may not be greater than the radius of the circle.

3. The length of tangent from an external point P on a circle with centre O is always less than OP.
Solution:

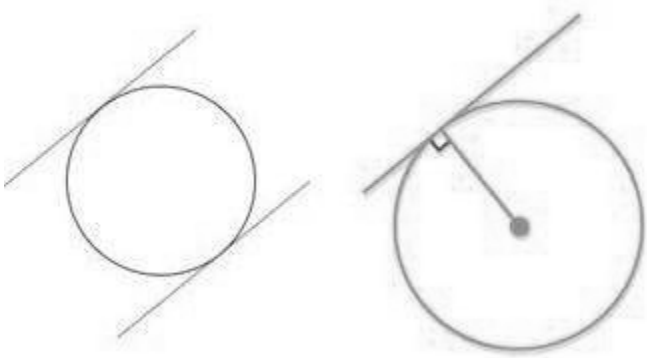
True
Justification:
Consider the figure of a circle with centre O.
Let PT be a tangent drawn from external point P.
Now, Joint OT.
OT ⊥ PT



We know that,
Tangent at any point on the circle is perpendicular to the radius through point of contact
Hence, OPT is a right-angled triangle formed.
We also know that,
In a right angled triangle, hypotenuse is always greater than any of the two sides of the triangle.
Hence,
OP > PT or PT < OP
Hence, length of tangent from an external point P on a circle with center O is always less than OP.

4. The angle between two tangents to a circle may be 0°.
Solution:

True
Justification:
The angle between two tangents to a circle may be 0°only when both tangent lines coincide or are parallel to each other.



5. If angle between two tangents drawn from a point P to a circle of radius a and centre O is 90°, then OP = a√2.

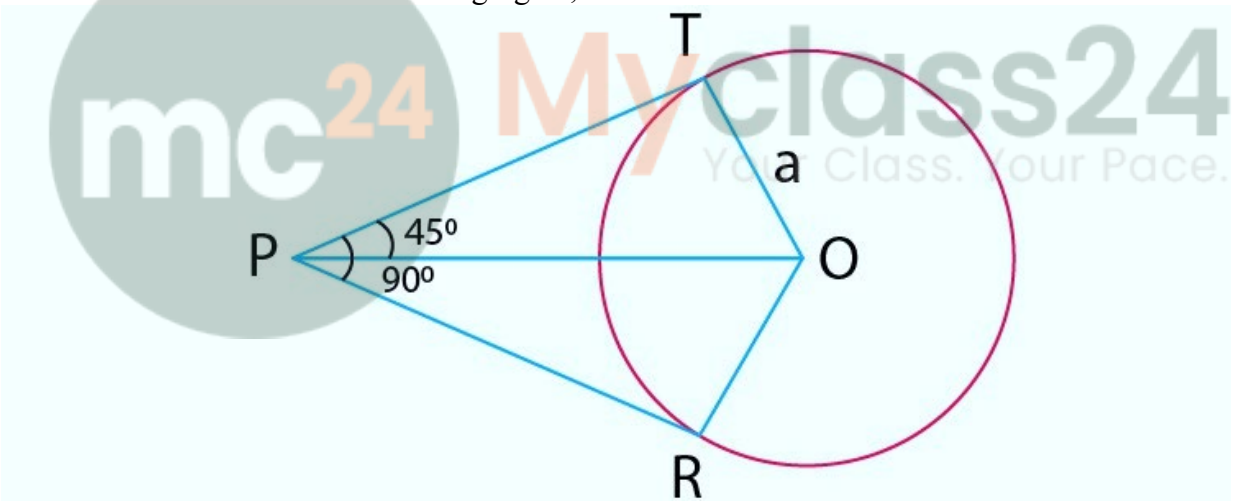
Solution:

Tangent is always perpendicular to the radius at the point of contact.

Hence, ∠OAP = 90

If 2 tangents are drawn from an external point, then they are equally inclined to the line segment joining the centre to that point.

Consider the following figure,



Therefore, ∠OPA = 12∠APB = 12×60° = 30°

Using angle sum property of triangle in ΔAOP,

∠AOP + ∠OAP + ∠OPA =180°

∠AOP + 90° + 30° = 180°

∠AOP = 60°

So, in △AOP

tan (∠AOP) = AP/ OA

√ 3= AP/a

Therefore, AP = √ 3a

Hence, proved