

MATHEMATICS • CLASS 10

CHAPTER 10

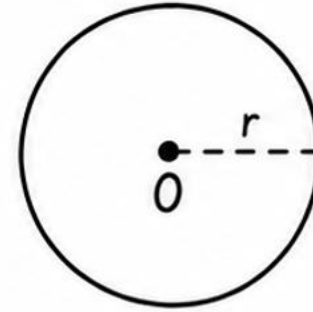
Circles

CHAPTER NOTES



CIRCLE AND LINE POSITIONS

- A circle is the set of all points in a plane that are at the same distance from a fixed point.
- The fixed point is called the centre of the circle.
- The distance from the centre to any point on the circle is called the radius.



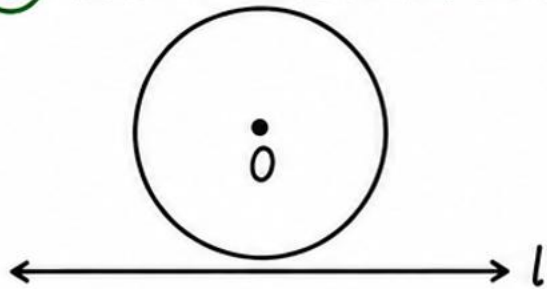
O : centre of the circle

r : radius of the circle

A line can have different positions with respect to a circle.

Depending on how many points the line has in common with the circle, we get three cases.

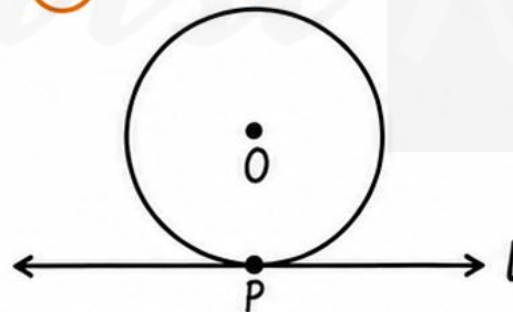
① NON-INTERSECTING LINE



The line does not meet the circle at any point.

0 common points

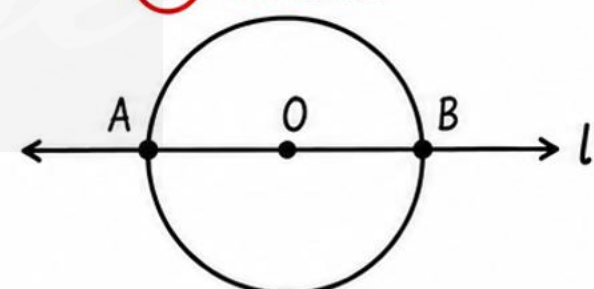
② TANGENT



The line touches the circle at exactly one point P .

1 common point

③ SECANT



The line cuts the circle at exactly two points A and B .

2 common points

COMPARISON →

Non-intersecting line
0 common points

Tangent
1 common point

Secant
2 common points

TANGENT AND POINT OF CONTACT

1. Tangent:

A tangent to a circle is a straight line that touches the circle at exactly one point and does not cut the circle.

2. Point of Contact:

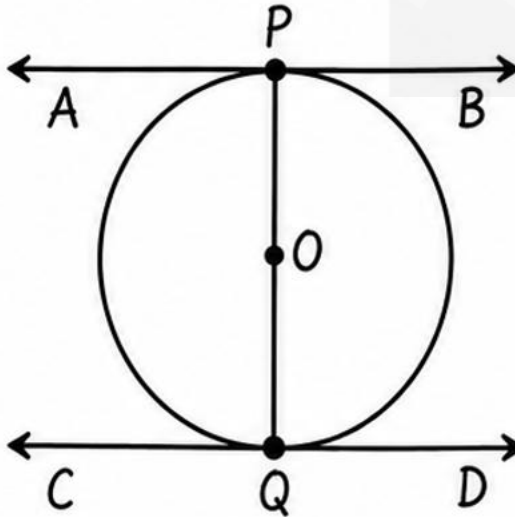
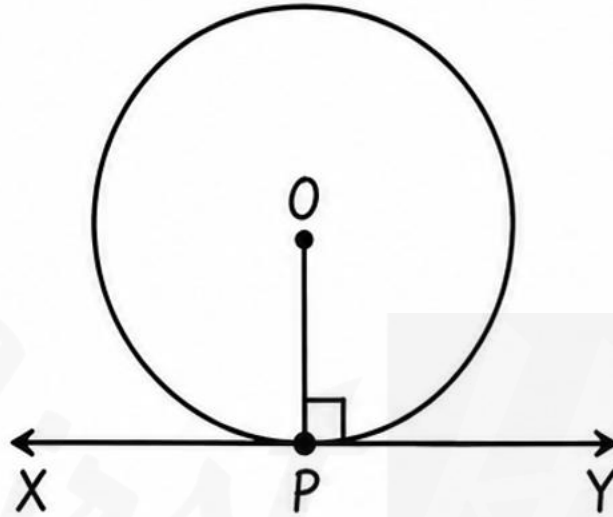
The point where a tangent touches the circle is called the point of contact.

3. Secant:

A secant to a circle is a straight line that cuts the circle at two points.

4. Radius to the Point of Contact:

The line segment joining the centre of the circle to the point of contact on a tangent is called the radius to the point of contact. It is perpendicular to the tangent.



The tangents at P and Q are parallel. PQ is the diameter of the circle.

- At a given point on a circle, there is exactly one tangent.
- Any other line passing through that point (except the tangent) will cut the circle at another point. Such lines are secants.
- A circle can have infinitely many tangents, one at each point on the circle.

Remember:

- ✓ A tangent touches at exactly one point.
- ✓ Other lines through that point are secants.
- ✓ Radius to the point of contact is perpendicular to the tangent.
- ✓ A circle has infinitely many tangents.

TANGENT IS PERPENDICULAR TO THE RADIUS

THEOREM – Tangent–Radius Theorem

The tangent at any point of a circle is perpendicular to the radius through the point of contact.

GIVEN

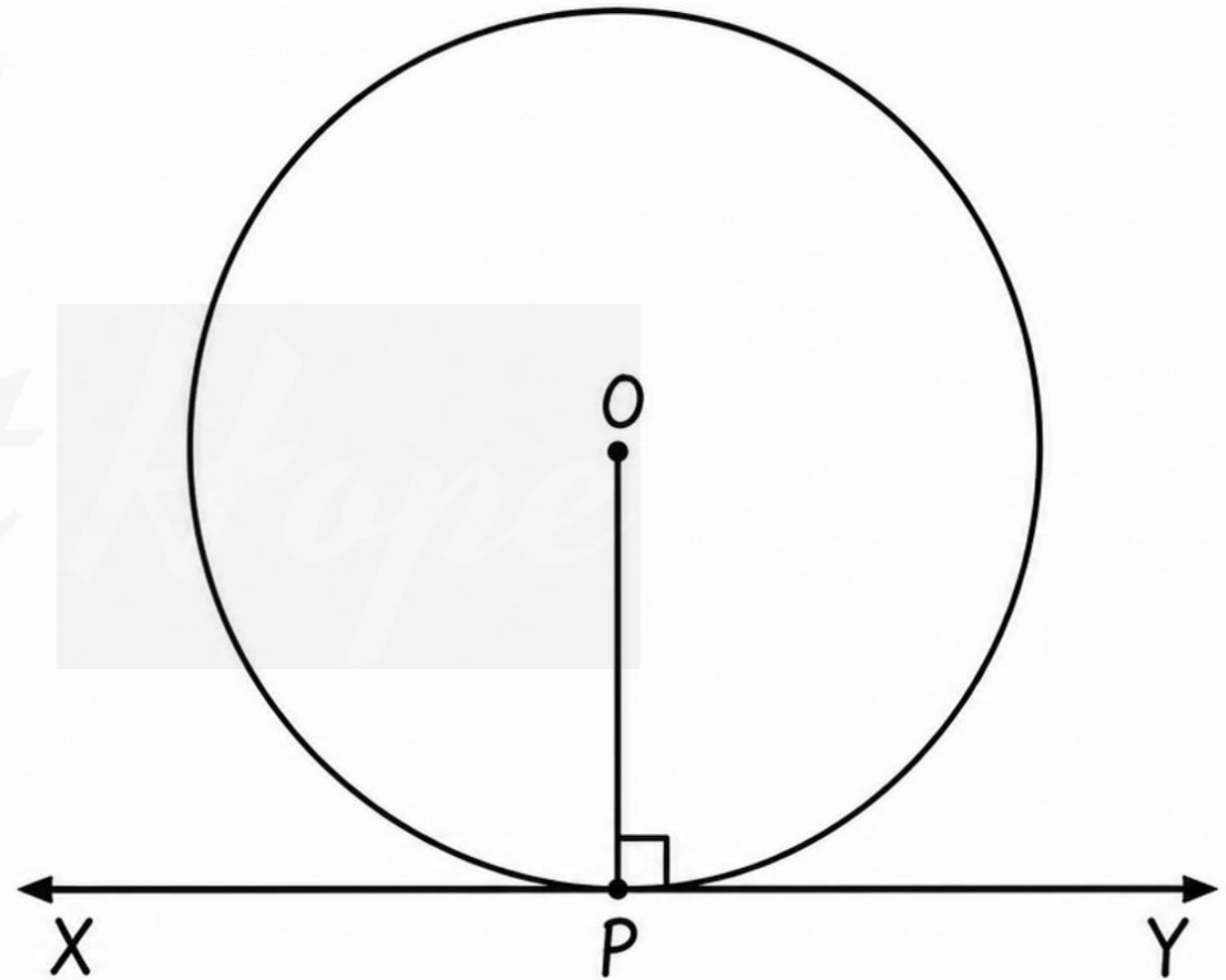
- XY tangent at P to circle with centre O .

TO PROVE

- $OP \perp XY$

KEY IDEA

- Every other point Q on the tangent lies outside the circle, so $OQ > OP$.





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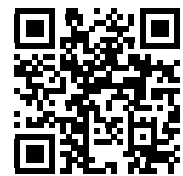


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