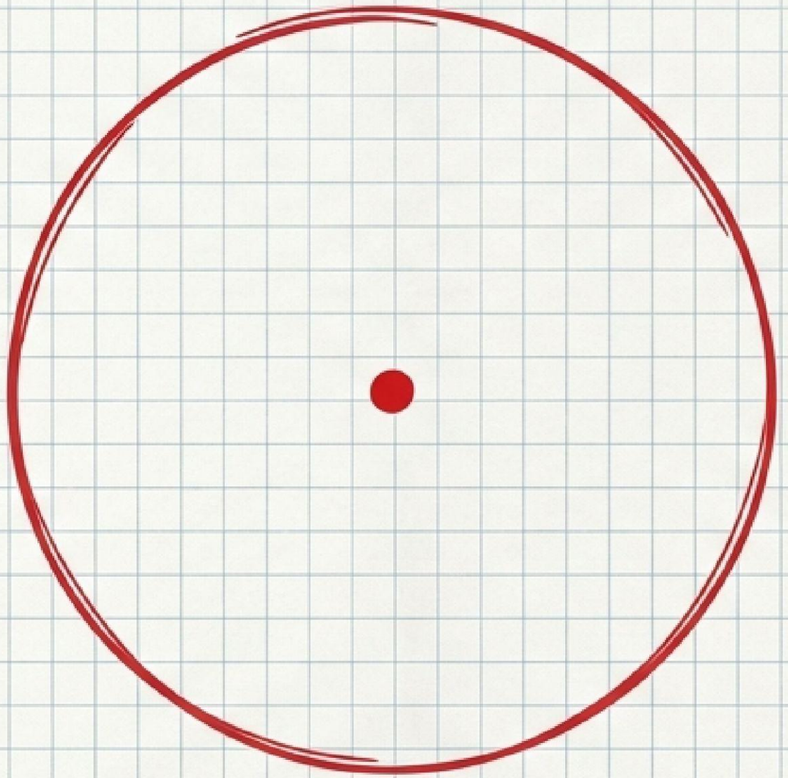
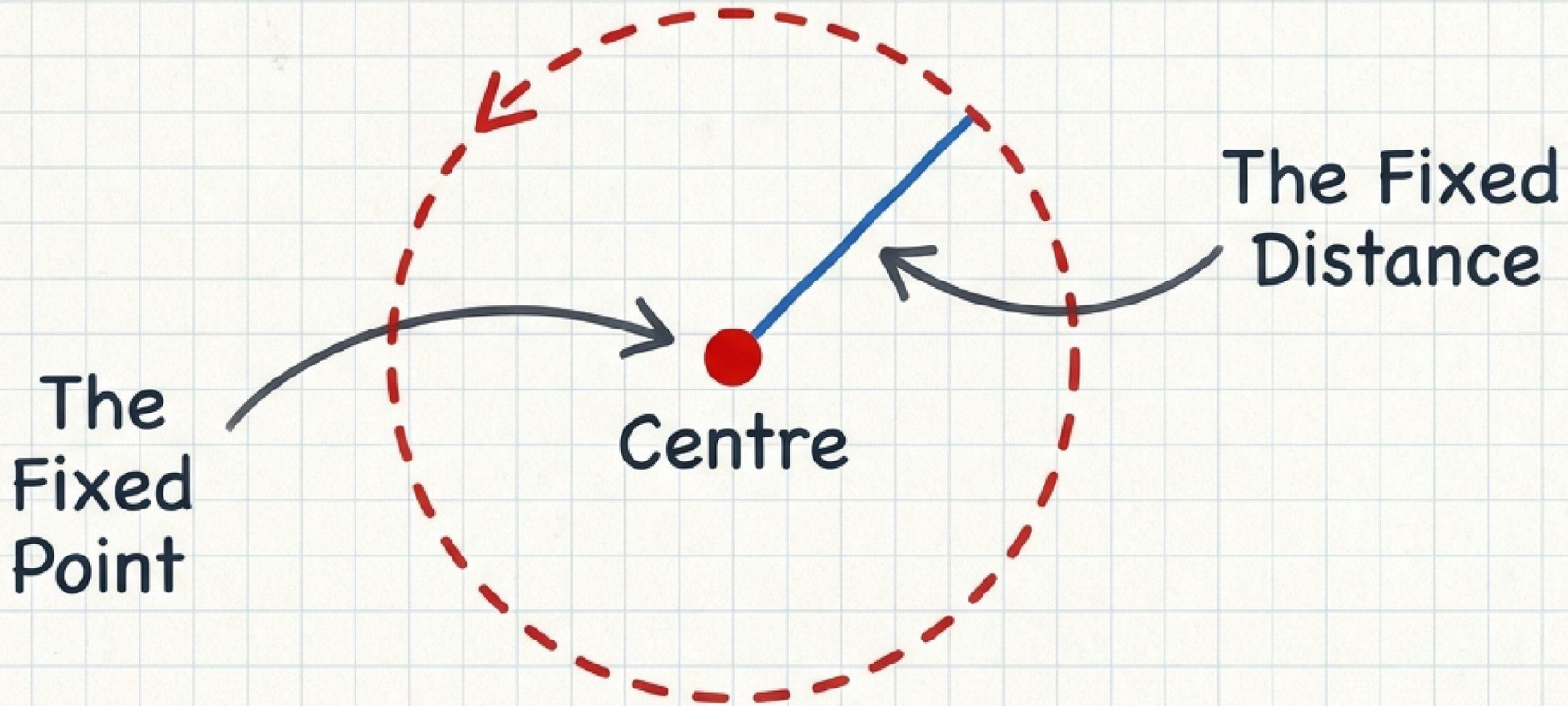
Circles: Study Notes & Key Properties

Class: Geometry | Topic: Introduction to Tangents & Theorems

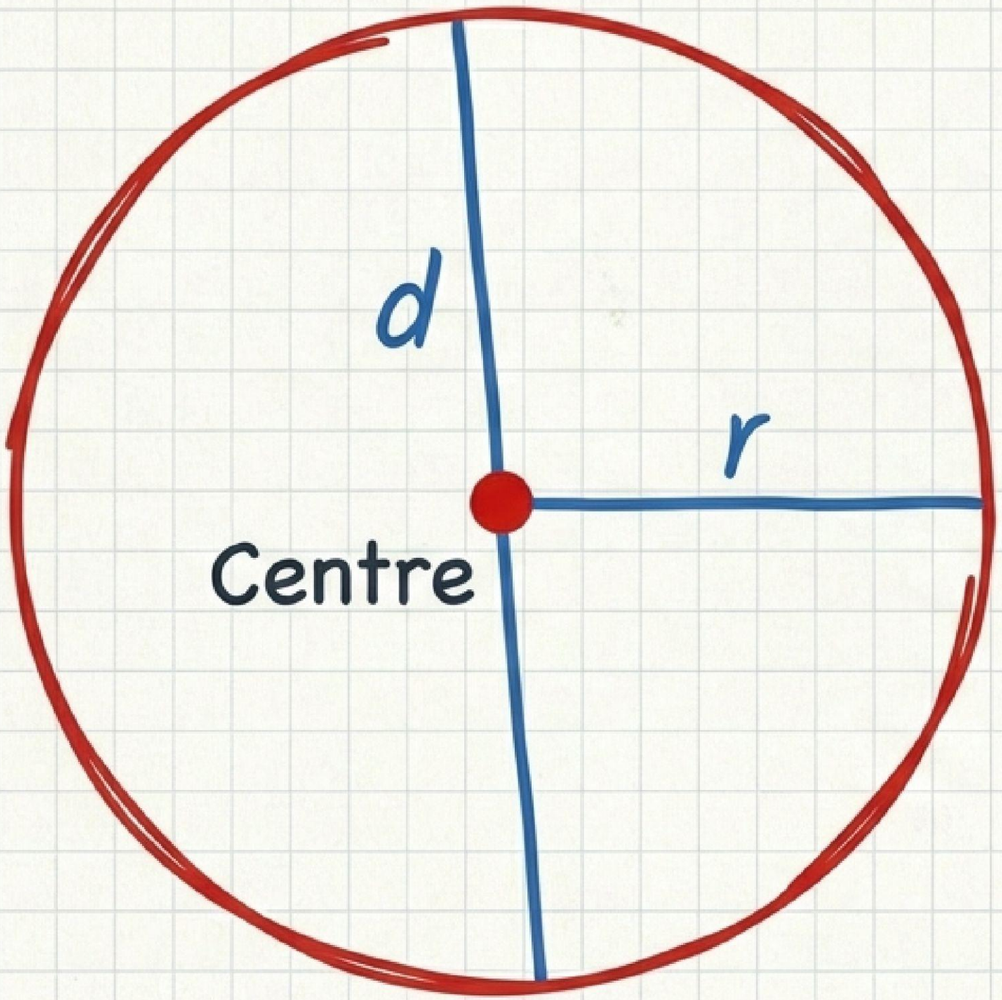


1. What is a Circle?

A collection of all points in a plane that are at a fixed distance from a fixed point.



2. Basic Terms: Radius vs. Diameter



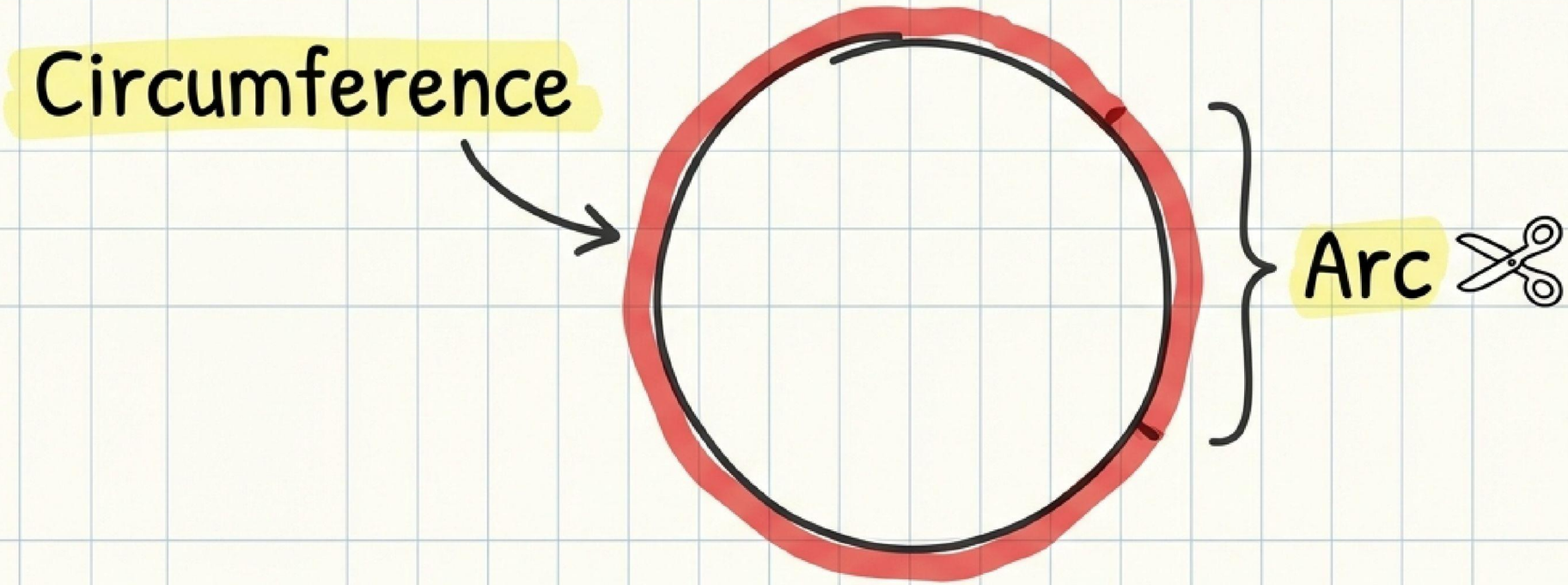
Radius (r): Distance from centre to any point on the circle.

Diameter (d): Line segment passing through the centre joining two points.

Formula: $d = 2r$

Example: If $r = 7$ cm, then $d = 14$ cm.

3. The Boundary

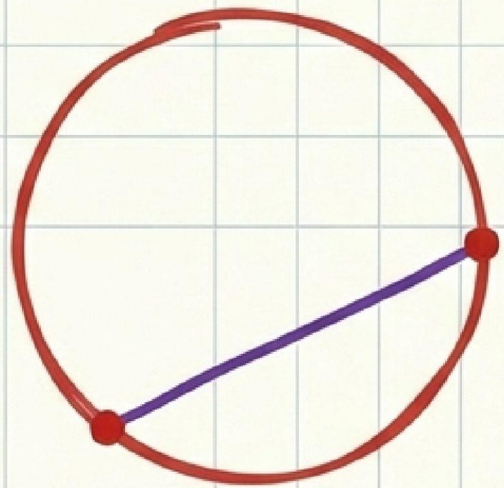


Circumference: The full boundary of the circle.

Arc: A part of the circle.

4. Crossing the Line: Chord vs. Secant

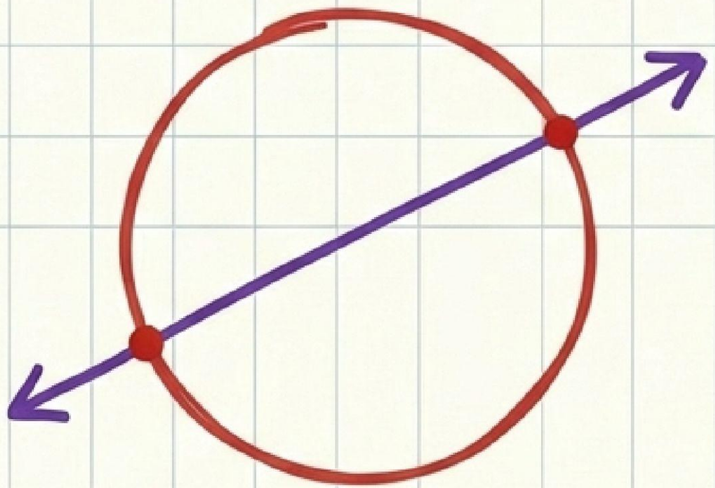
Chord



Joins any two points on the circle.

*Diameter is the longest chord!

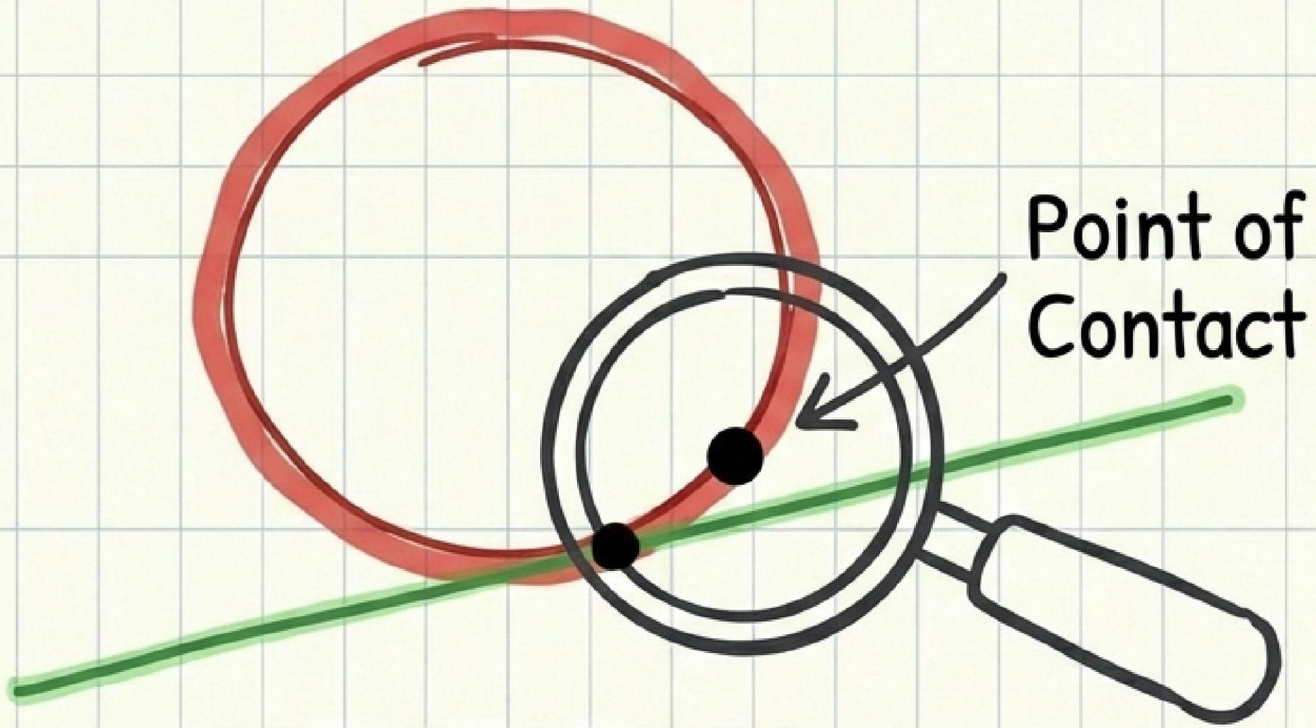
Secant



A line that cuts the circle at two points.

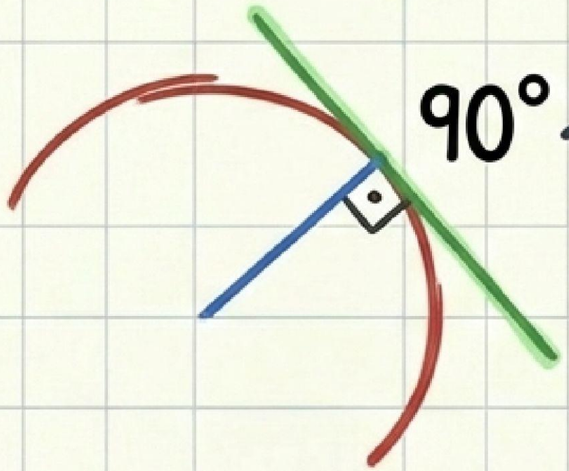
5. Just Touching: The Tangent

A line that touches the circle at exactly one point.



Tangent = 1 Point. Secant = 2 Points.

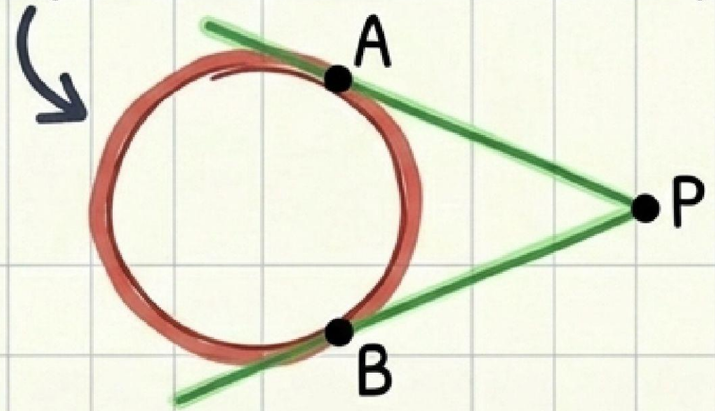
6. Important Tangent Properties



1. Tangent is ⊥ to radius at point of contact.

2. Only ONE tangent can be drawn at any specific point on a circle.

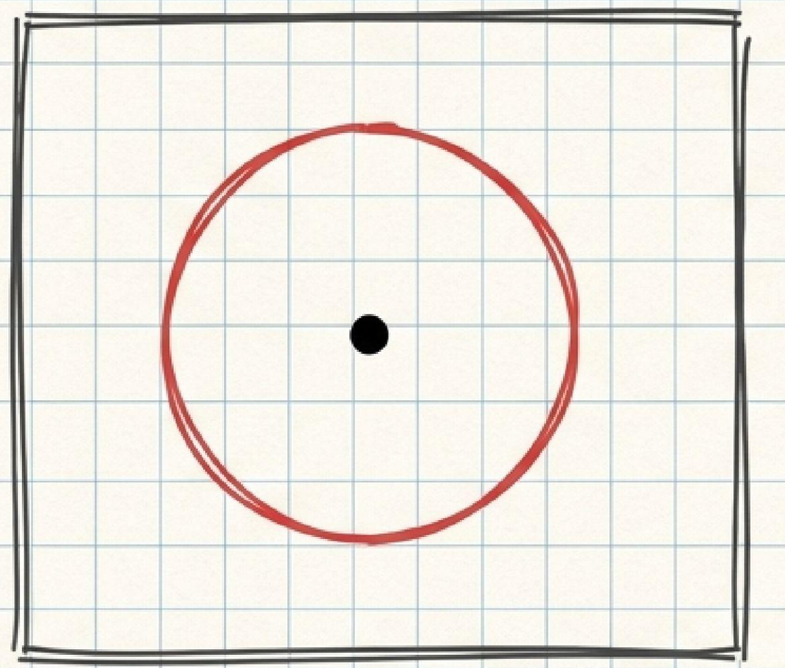
(The Ice Cream Cone)



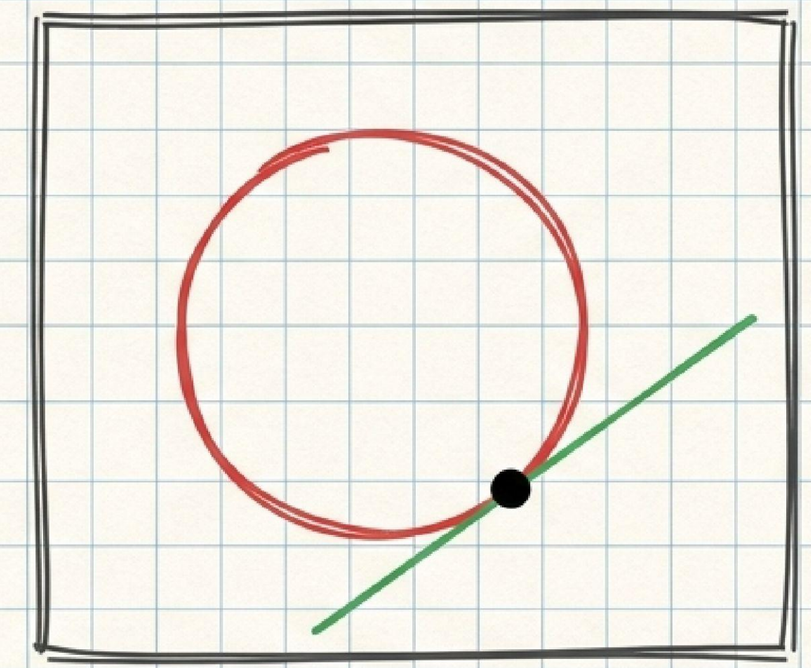
3. Lengths from an external point are equal.

$$PA = PB$$

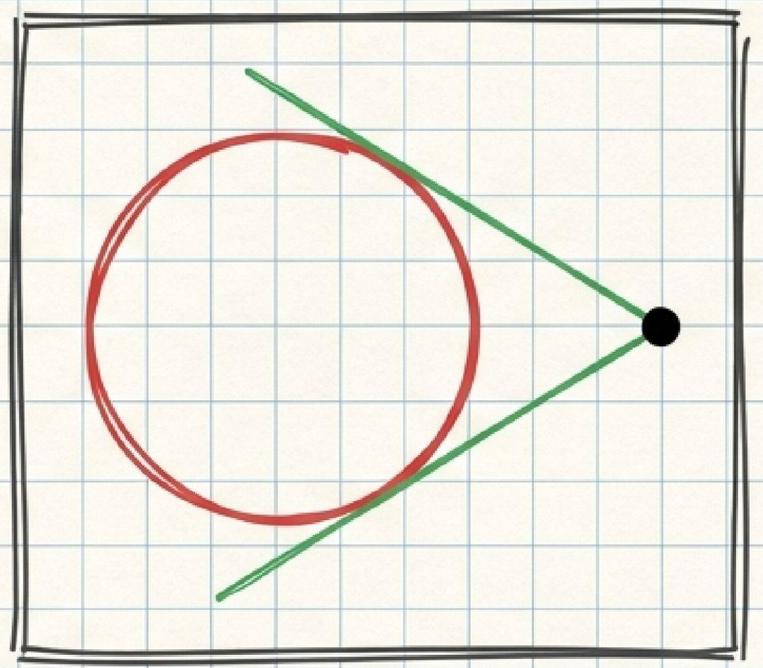
7. How Many Tangents?



Point Inside
→ 0 Tangents



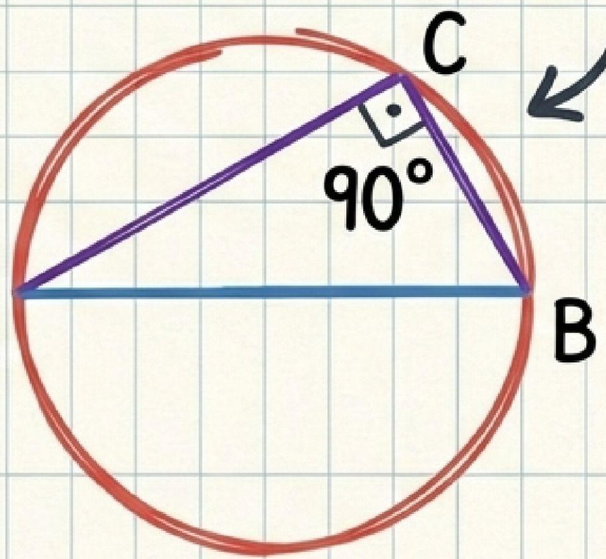
Point On Circle
→ 1 Tangent



Point Outside
→ 2 Tangents

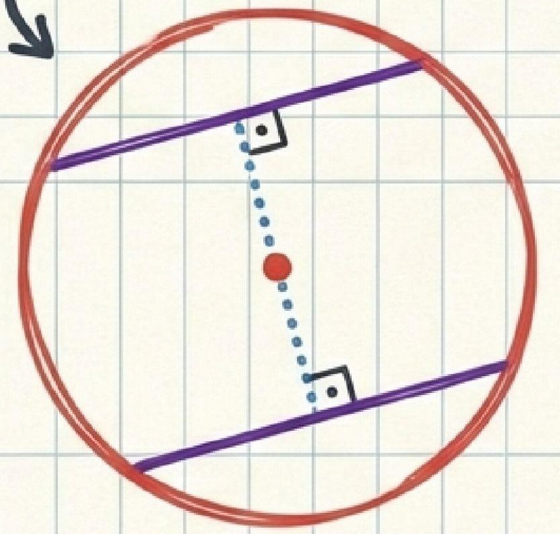
8. Key Theorems: Angles & Chords

Angle in a Semicircle



Angle subtended by a diameter is always 90°.

Equal Chords



Equal chords are equidistant from the centre.

9. Quick Check: MCQ Challenge

Q1: The diameter is:

(a) Half radius (b) Equal to radius (c) Twice the radius

$d = 2r$

Q2: Line touching at only one point:

(a) Chord (b) Secant (c) Tangent

Q3: Tangents from a point outside the circle:

(a) 1 (b) 2 (c) 0

Q4: Angle subtended by diameter on the circle:

(a) 45° (b) 60° (c) 90°

Good Luck! ☺