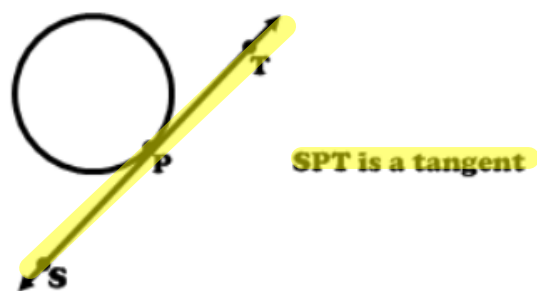


## RELATIONSHIPS WITH TANGENTS

### DEFINITION

A tangent is a line that intersects a circle at one point.

EXAMPLE:



## TANGENT PROPERTIES

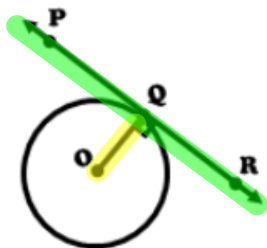
### Property 1 (TANGENT-RADIUS RULE)

The line drawn perpendicular to a radius touching its endpoint is a tangent to the circle.

### Property 2

A line drawn perpendicular to a tangent of a circle at the point of tangency passes through the centre of the circle.

### DIAGRAM (1 & 2)



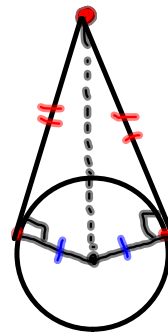
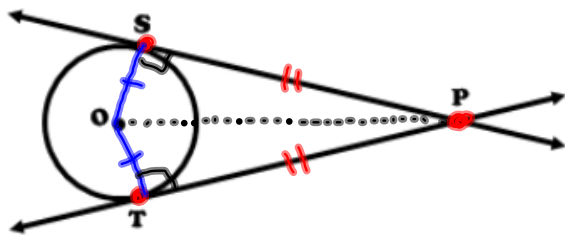
$$m_{OQ} = \frac{1}{2}$$

$$m_{PR} = -2$$

**Property 3 (TANGENT-TANGENT RULE)**

Tangents drawn from a point outside the circle are equal in length (and with radii and a line through the center, form two identical triangles).

For example, in the diagram below  $PS = PT$ .

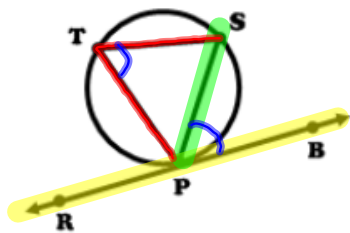


$$\begin{aligned} OS &= \text{Radius} & OS &= OT \\ OT &= \text{Radius} \end{aligned}$$

**Property 4 (TANGENT-CHORD RULE)**

The angle between a **tangent** and a **chord** is equal to the inscribed angle subtended on the opposite side of the chord.

For example, in the diagram below,  $\angle RPT = \angle S$  and  $\angle SPB = \angle T$ .



$$\angle SPB = \angle STP$$