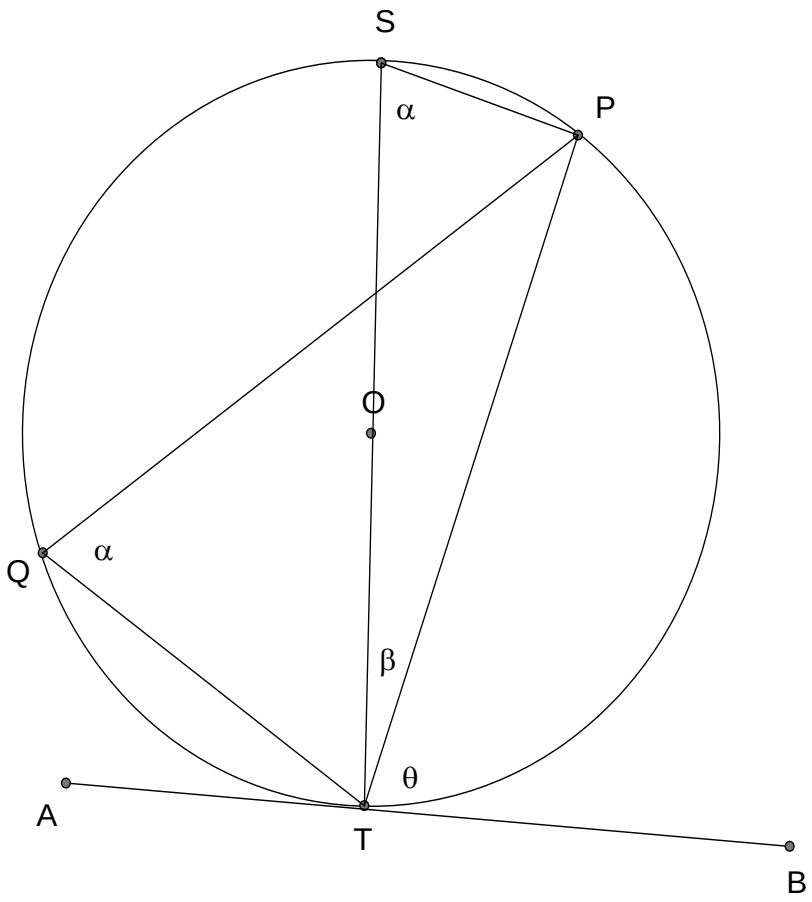
Year 10 Mathematics Extension Investigation

Circle Geometry Properties!!! Take Home Part Solution 5 of 7

TASK FIVE: Angles in the Alternate Segment Theorem



Given: Circle centre O and ΔQPT with Q, P and T are points on the circumference. Point S such that $\angle PST$ and $\angle PQT$ are angles in the same segment S and ST is a diameter of the circle.

To Prove: $\angle PTB = \angle PQT$

Extension to the diagram: AB tangent to circle at T.

Proof: Let $\angle PST = \alpha$, $\angle PTS = \beta$ and $\angle PTB = \theta$

$\angle SPT = 90°$	Right angle in a semicircle.
$\alpha + \beta = 90°$	Angle sum of a triangle is 180°
$\theta + \beta = 90°$	Tangent is $\perp$ to radius.

$\therefore \quad \alpha = \theta$

$\angle PST = \angle PQT$ Angles in the same segment.

$\therefore \quad \angle PTB = \angle PQT$

Q.E.D.