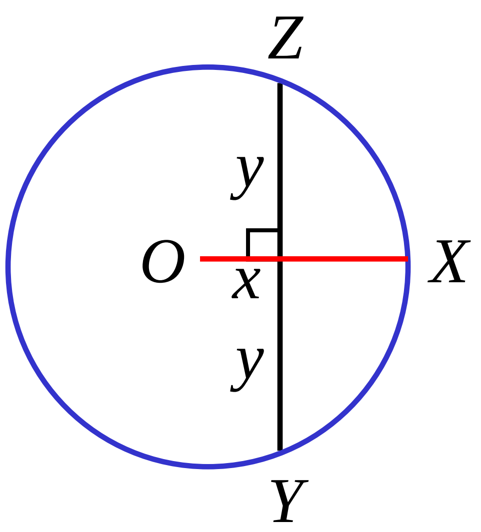
Tangent Theorems

(7) *Assumption:*

The size of the angle between a tangent and the radius drawn to the point of contact is 90 degrees.

$OX \perp XY$ (radius $\perp$ tangent)



Let x be the distance of the chord from the centre.

Let $2y$ be the length of the chord.

$OX \perp YZ$ (line joining centre to midpoint, $\perp$ to chord)

As $x \to$ radius

$y \to 0$

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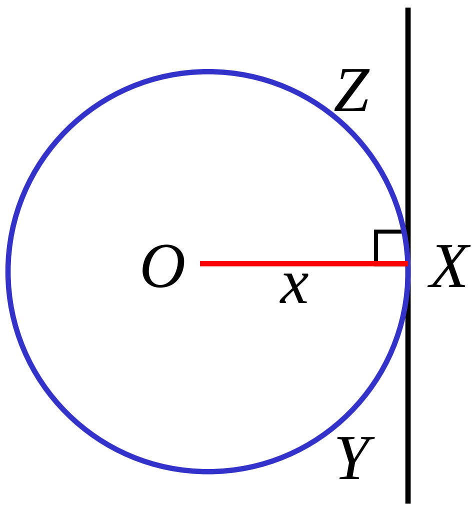

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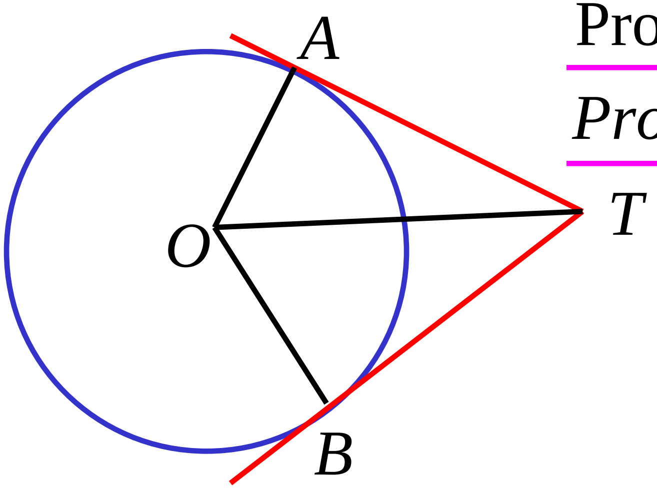
(8) From any external point, two equal tangents may be drawn to a circle. The line joining this point to the centre is an axis of symmetry

$AT = BT$ (tangents from external point are =)



Prove: $AT = BT$

Proof: Join OA, OB and OT

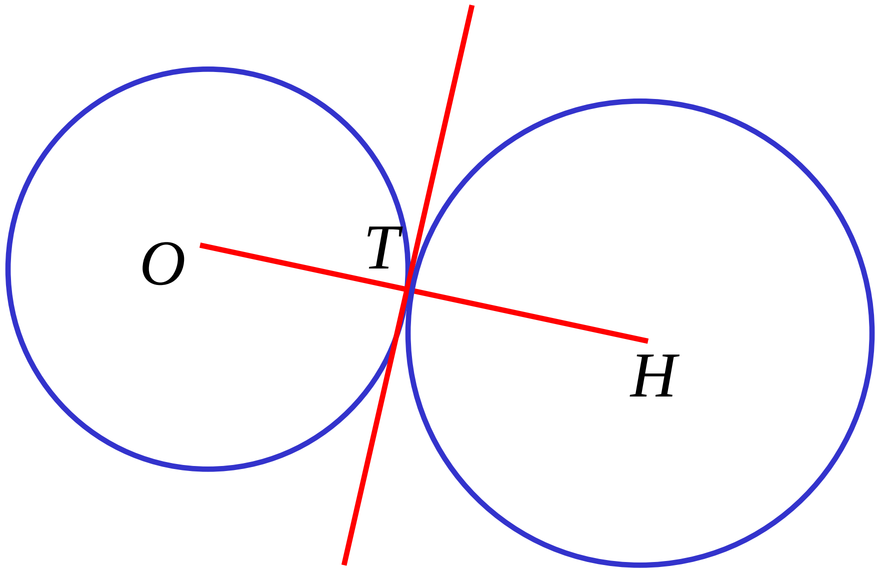
$\angle OAT = \angle OBT = 90^\circ$ (radius ⊥ tangent)

OT is a common side

$OA = OB$ (= radii)

$\therefore \Delta OAT \equiv \Delta OBT$ (RHS)

$\therefore AT = BT$ (matching sides in ≡ Δ's)



OTH is collinear $\left(\begin{array}{l}\text{centres and point of contact}\\ \text{of common tangent collinear}\end{array}\right)$

Exercise 9E; 1aceg, 2bdfh, 3ac, 4bd, 6bc, 9, 10ac, 12b, 14, 16a