Angles Formed by Chords, Tangents & Secants

Vocabulary:

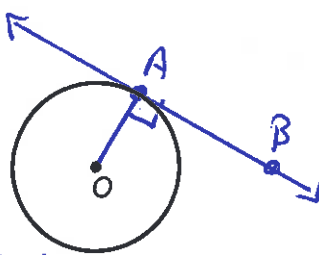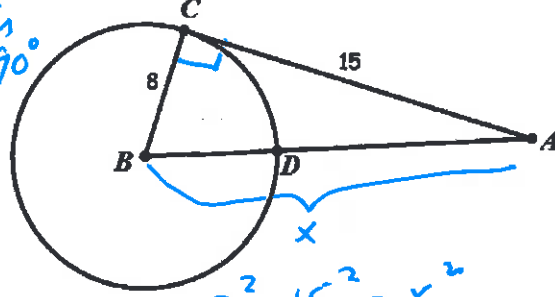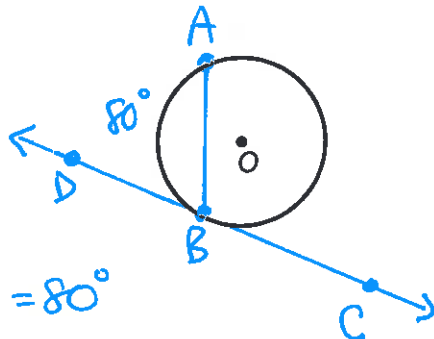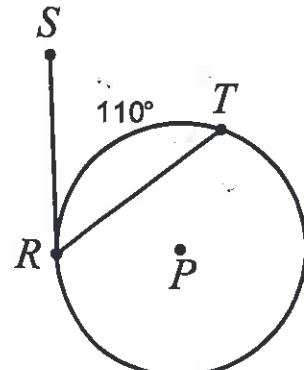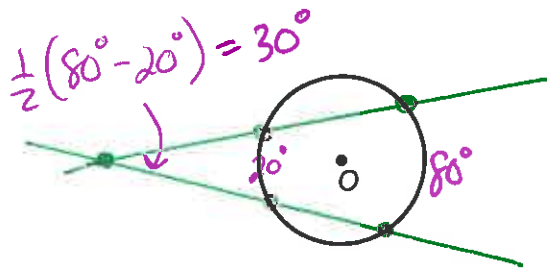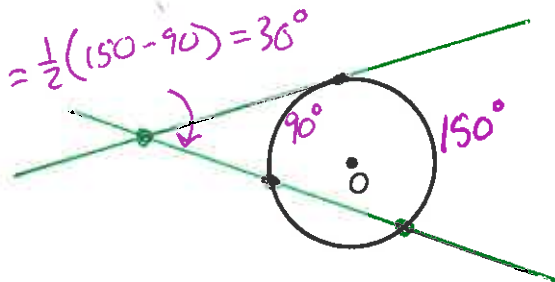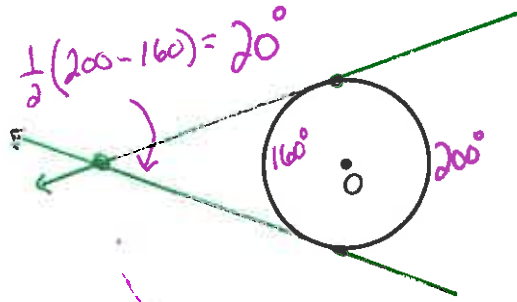| Tangent	Secant
1 intersection point	2 intersection points.

Theorem: A tangent is perpendicular to the radius it is drawn to.

Tangent $\overleftrightarrow{AB}$

$m\angle OAB = 90°$

Example: Tangent $\overline{AC}$. Find AB.

makes
$m\angle C = 90°$

$8^2 + 15^2 = x^2$
$64 + 225 = x^2$
$289 = x^2$
$x = 17$

Theorem: The angle made by a tangent and chord is half the measure of the arc cut.

$m\overset{\frown}{AB} = 80°$

$\Rightarrow m\angle ABD = 40°$

Example: $m\overset{\frown}{RT} = 110°$. Find $m\angle SRT$

$m\angle SRT = \frac{1}{2}(110) = 55°$

| **Theorem:** The angle formed by two tangents or secants that intersect **outside** a circle = to **half the difference** of the arcs that are cut.	**Example: Find x and** y.

Theorem: The angle formed by two tangents or secants that intersect **outside** a circle = to **half the difference** of the arcs that are cut.

$\frac{1}{2}(200-160)=20°$

160°   200°   O

$=\frac{1}{2}(150-90)=30°$

90°   150°   O

$\frac{1}{2}(80°-20°)=30°$

20°   80°   O

Example: Find x and y.

60°   20° $x°$ 75°   30°   O $y°$

$x=\frac{1}{2}(60-20)=\boxed{20°}$

$2(30)=y-75$
$60=y-75$
$\boxed{135°=y}$
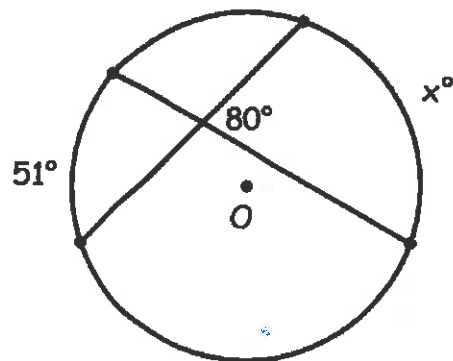

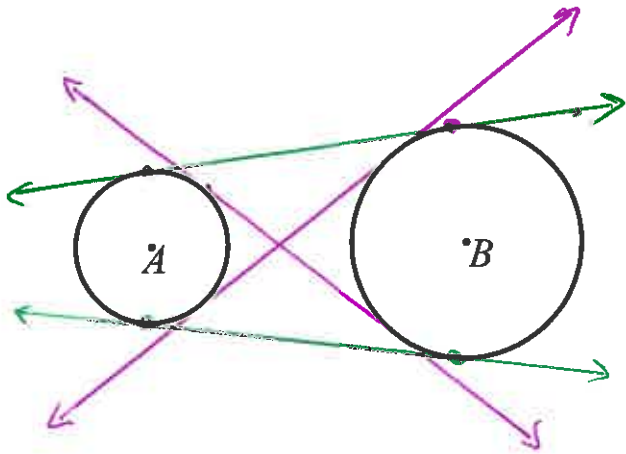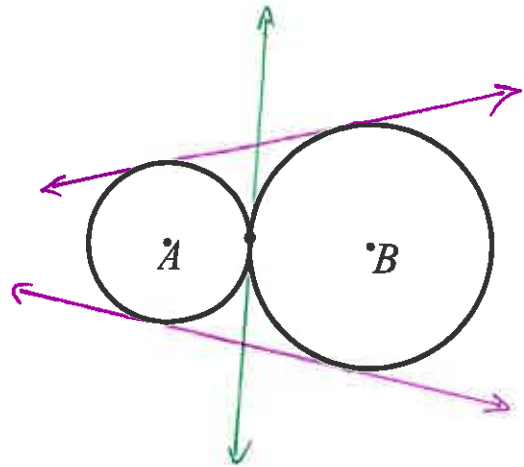| **Theorem:** The angle formed by two chords that intersect **inside** a circle = **half the sum** of the arcs that are cut.	**Example: Find x.**

Theorem: The angle formed by two chords that intersect **inside** a circle = **half the sum** of the arcs that are cut.

60°   100   O

$=\frac{1}{2}(100+60)$
$=80°$

Example: Find x.

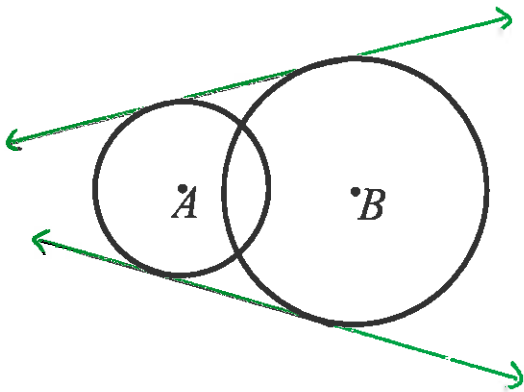80°   51° $x°$ O
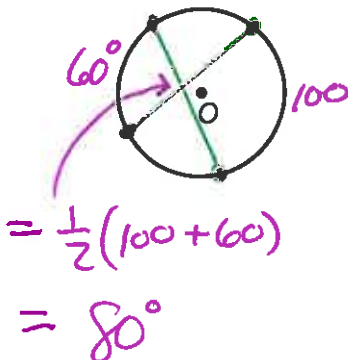
$2(80)=x+51$
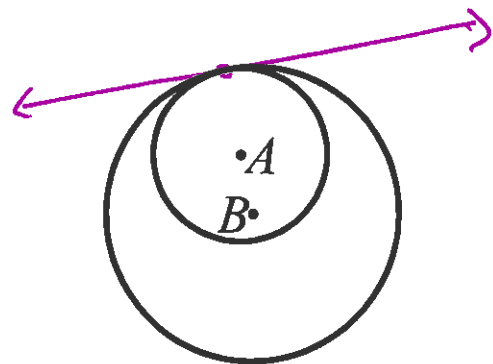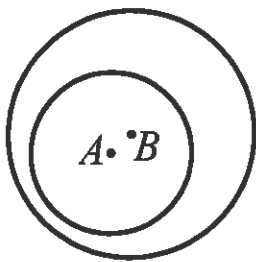$160=x+51$
$\boxed{x=109°}$

4 common Tangents.

3 common Tangents

2 common Tangents.

1 common Tangent.

0 common Tangents.