**MER 101: Engineering Graphics/AT**

**Hand-Drawing: Arc Tangent**

### Arc Tangent to Line and Arc

**Given:** Arc - R₁ and line A-B.

**Problem:** Draw arc with given radius tangent to line A-B and arc R₁.

**Step No. 1:**
- With the distance of radius - R - draw line C-D parallel to line A-B.

**Step No. 2:**
- With the distance of R₁ plus R - draw arc E-F from point X.
- Note intersecting point O-.

**Step No. 3:**
- Draw line O-T₁ and line O-X. Note tangent point T₂, with radius - R - from point O-draw arc T₁ - T₂.

### Arc Tangent to Two Arcs

**Given:** Arcs R₁ and R₂.

**Problem:** Draw an arc with the radius of R₂ - tangent to arcs R₁ and R₂.

**Step No. 1:**
- With the radius of R₁ - plus R - draw arc A-B.

**Step No. 2:**
- With the radius of R₂ plus R - draw arc C-D. Note the intersecting point O - with arcs A-B and C-D.

**Step No. 3:**
- Draw line O-X and O-Y. Note tangent points T₁ and T₂, with the radius - R - from point O-draw arc T₁ - T₂.
**Arc Tangent to Line and Arc**

**Step No. 1**
- Given: Line - A-B and Arc - C-D.
- Required: Draw arc with radius R, tangent to line A-R and arc C-D.
- With the distance of radius R, draw line E-F parallel to line A-B.

**Step No. 2**
- \( R^2 = R_1 - R \)
- To find the radius \( R^2 \), subtract the radius R from the radius R_1.

**Step No. 3**
- From point X with radius \( R^2 \), draw arc G-H. Note intersecting point O.

**Step No. 4**
- From point O, drop perpendicular to line A-B, this is line O-T_1.
- Draw line X-O-T_2. Point T_2 is the tangent point on arc C-D.

**Step No. 5**
- With radius R, from point O, draw arc T_1 - T_2.
ARC TANGENT TO TWO ARCS

**REQUIRED RADIUS**

**-R-**

**STEP NO.1**

GIVEN = CIRCLE-R1 AND CIRCLE-R2.
REQUIRED RADIUS -R-
REQUIRED = DRAW AN ARC WITH THE GIVEN RADIUS -R- TANGENT TO THE TOP OF THE TWO CIRCLES.

**STEP NO.2**

WITH THE RADIUS OF -R- MINUS R1.
FROM POINT-X DRAW ARC A-B.

**STEP NO.3**

DRAW LINE O-X EXTENDED TO LOCATE TANGENT POINT T1.
DRAW LINE O-Y EXTENDED TO LOCATE TANGENT POINT T2.
WITH THE RADIUS -R- FROM POINT-O-
DRAW ARC - T1-T2.
ARC TANGENT TO TWO ARCS

**Required Radius**

**Required Radius**

**Step No. 1**

- Given: Required radius $-r-$
- Circle $-r^1-$ and circle $-r^2-$
- Required = draw an arc with radius $-r-$ tangent to the top of circle $-r^1-$ and the bottom of circle $-r^2-$.

- With radius $-r-$ minus radius $-r^1-$ from point $-y-$ draw arc $-a-b-$.

**Step No. 2**

- With radius $-r-$ plus the radius $-r^2-$ from point $-x-$ draw arc $-c-d.-$ note intersecting point $-o-.$

**Step No. 3**

- From point $-o-$ draw line $-o-t^2-x-.$
- From point $-o-$ draw line $-o-y-t^1-.$
- From point $-o-$ draw arc $-t^1-t^2-$ with the required radius $-r-.$
Practice Exercise 1