# 2. Parallel Line

-- Development of Cylindrical Surfaces

- Hollow cylinder
- Truncated cylinder
- Elbow development

Development of a hollow cylinder

- The width of the development is equal to the height of the cylinder.
- The length of the development is equal to the circumference of the cylinder plus the seam allowance.

ENLARGED VIEW OF SEAM AT A

CIRCUMFERENCE PLUS SEAM ALLOWANCE

DEVELOPMENT LINES

INSIDE SURFACE SHOWN

CIRCUMFERENCE
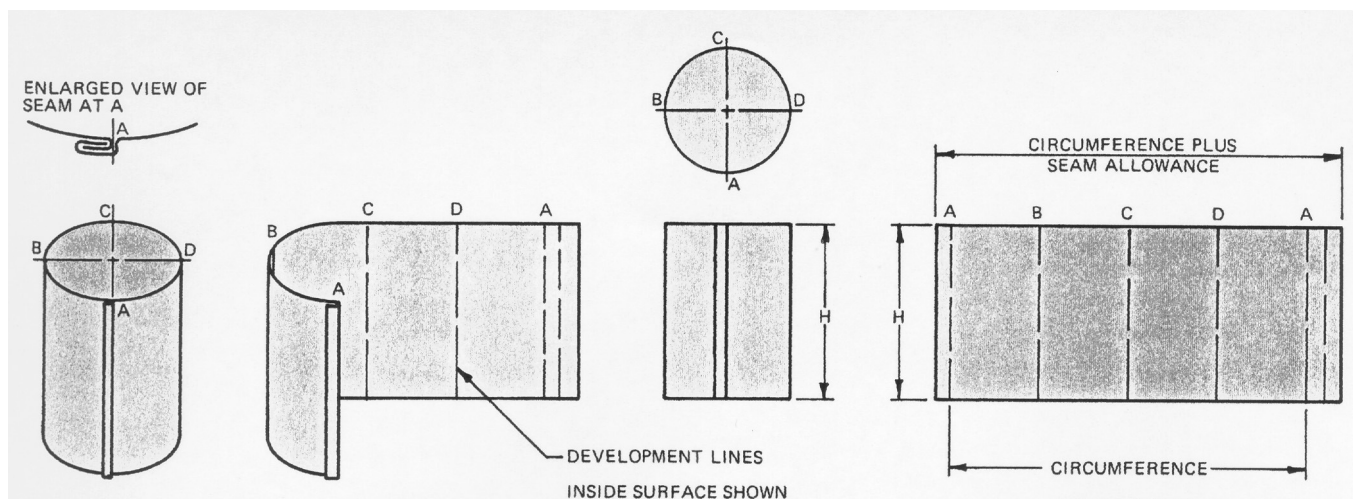
Development of a truncated cylinder

- Points of intersection are established to give the curved shape on the development.
- These points are derived from the intersection of a length location, representing a certain distance around the circumference from a starting point
- The height location at that same point on the circumference
- The closer the points of intersection are to one another, the greater the accuracy of the development
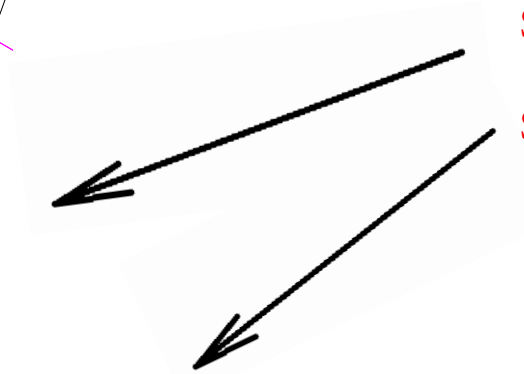- An irregular curve connects the points of intersection.
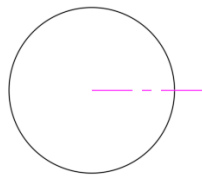
Step 1 - Draw a center line
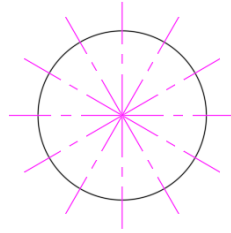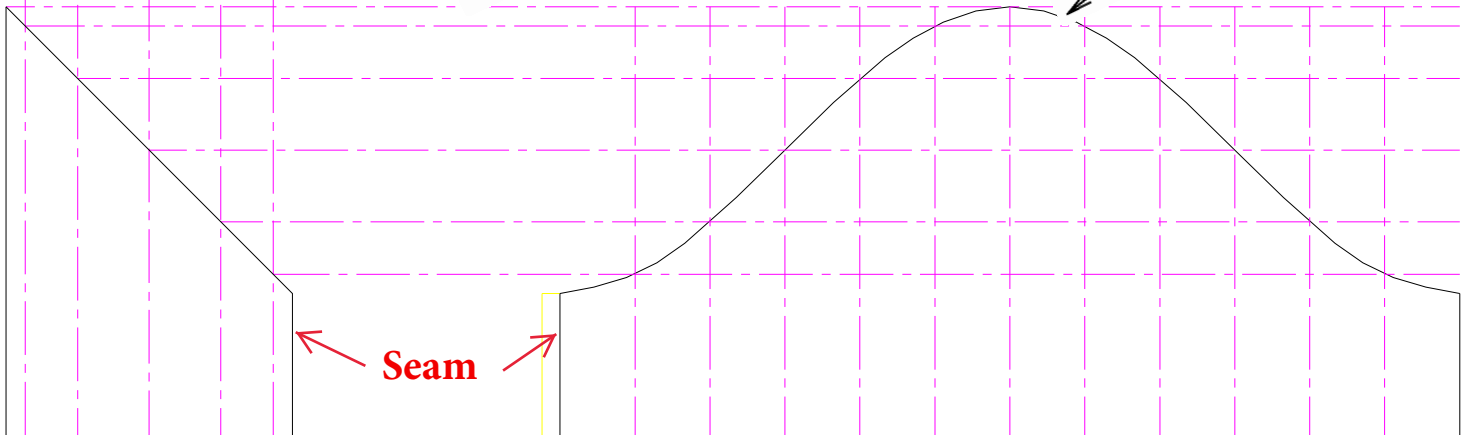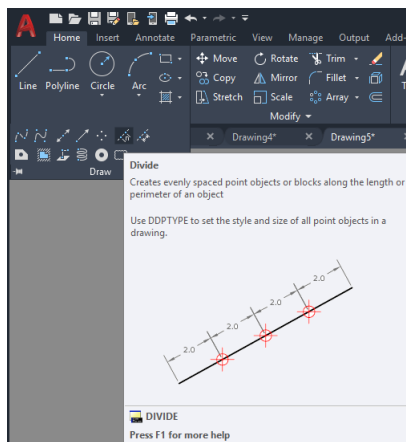
Step 2 - Create the polar array
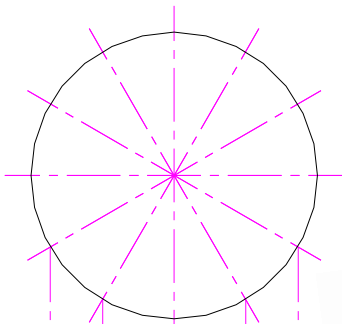
Step 3 - Explode the array

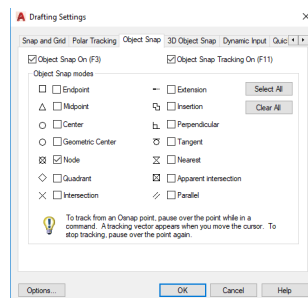**Step 4 - Project the intersections to the front view**

Step 5 - Project the intersections to the surface development

Spline

Seam

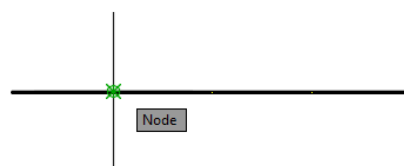**The length of the development is the circumference of the circle**

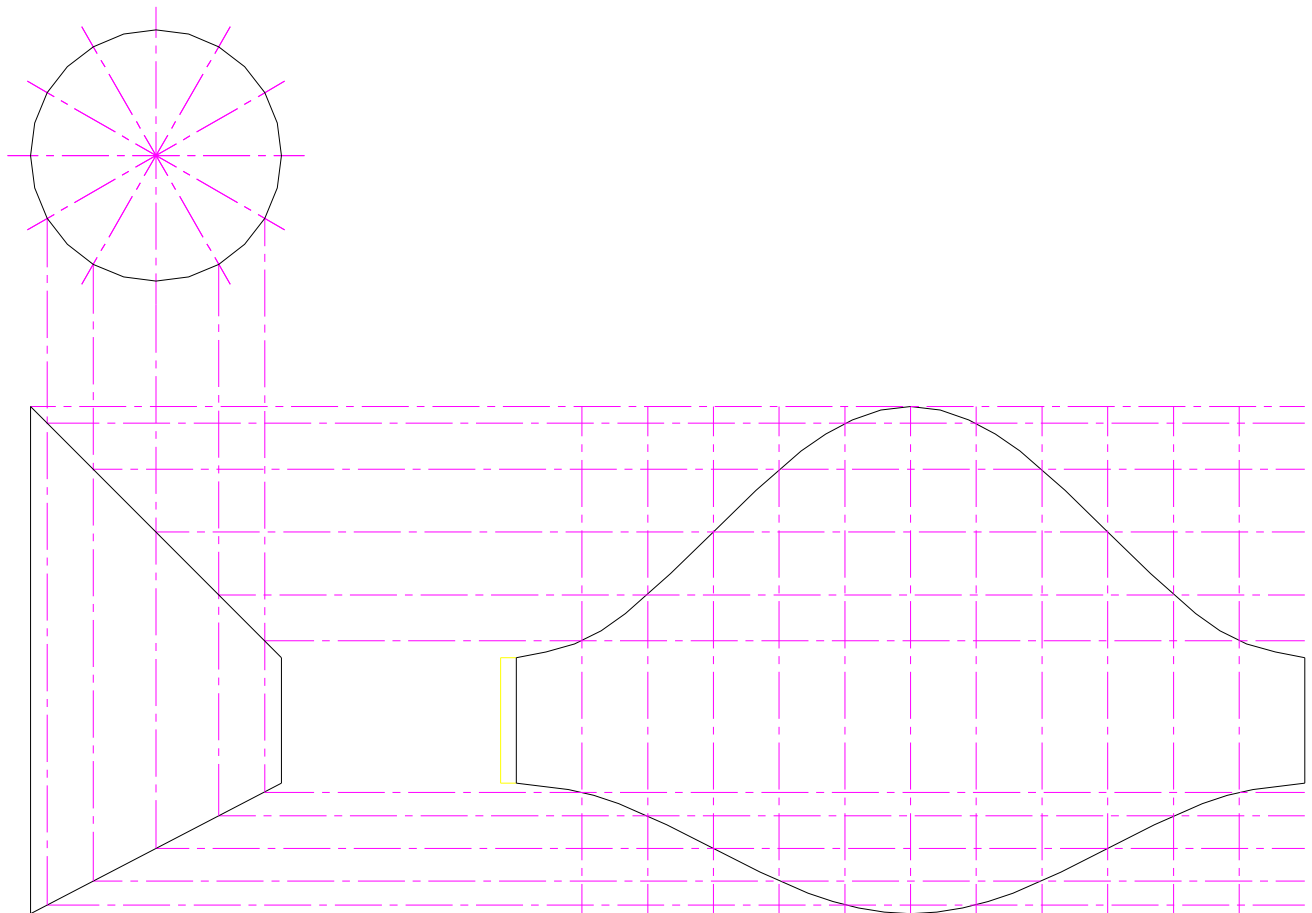**Draw a line and divide it in 12 equal parts**

Turn on the Node OSnap

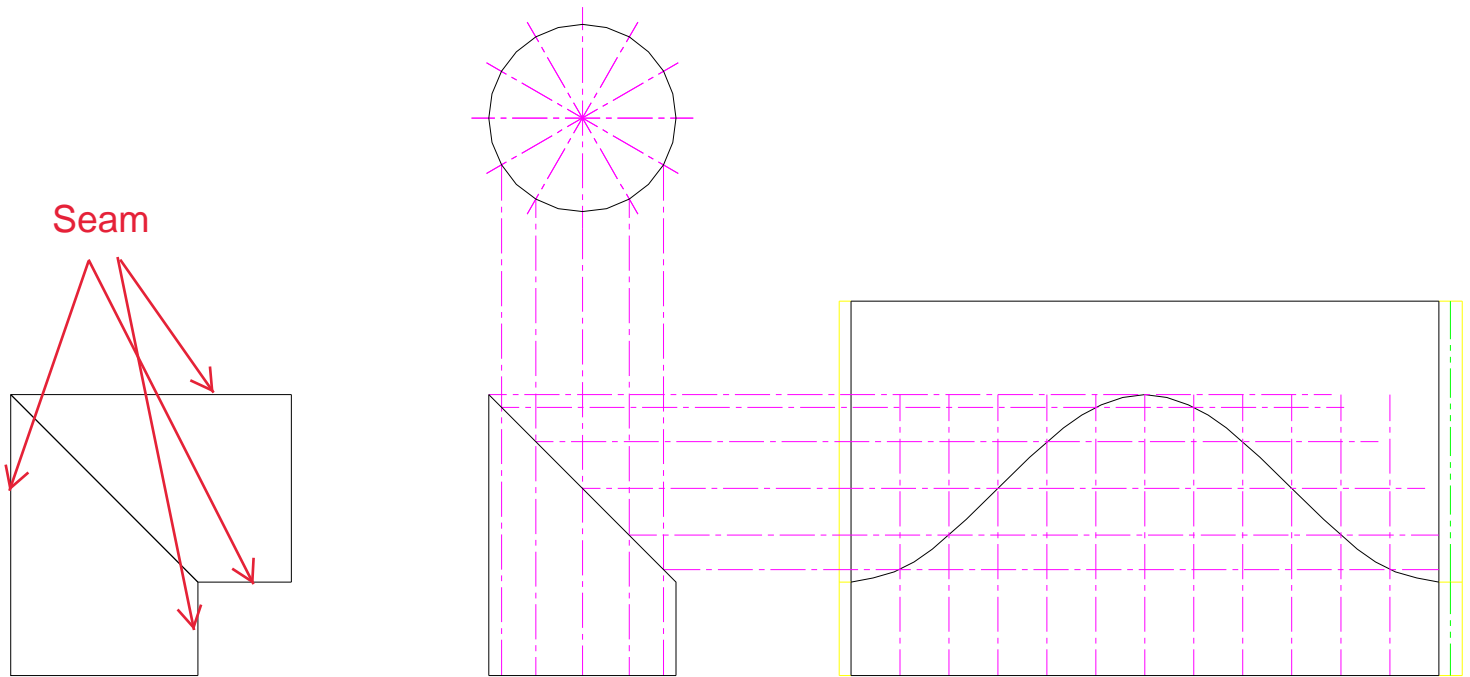**Track the nodes to draw vertical lines**

Development of a cylinder with the top and bottom truncated
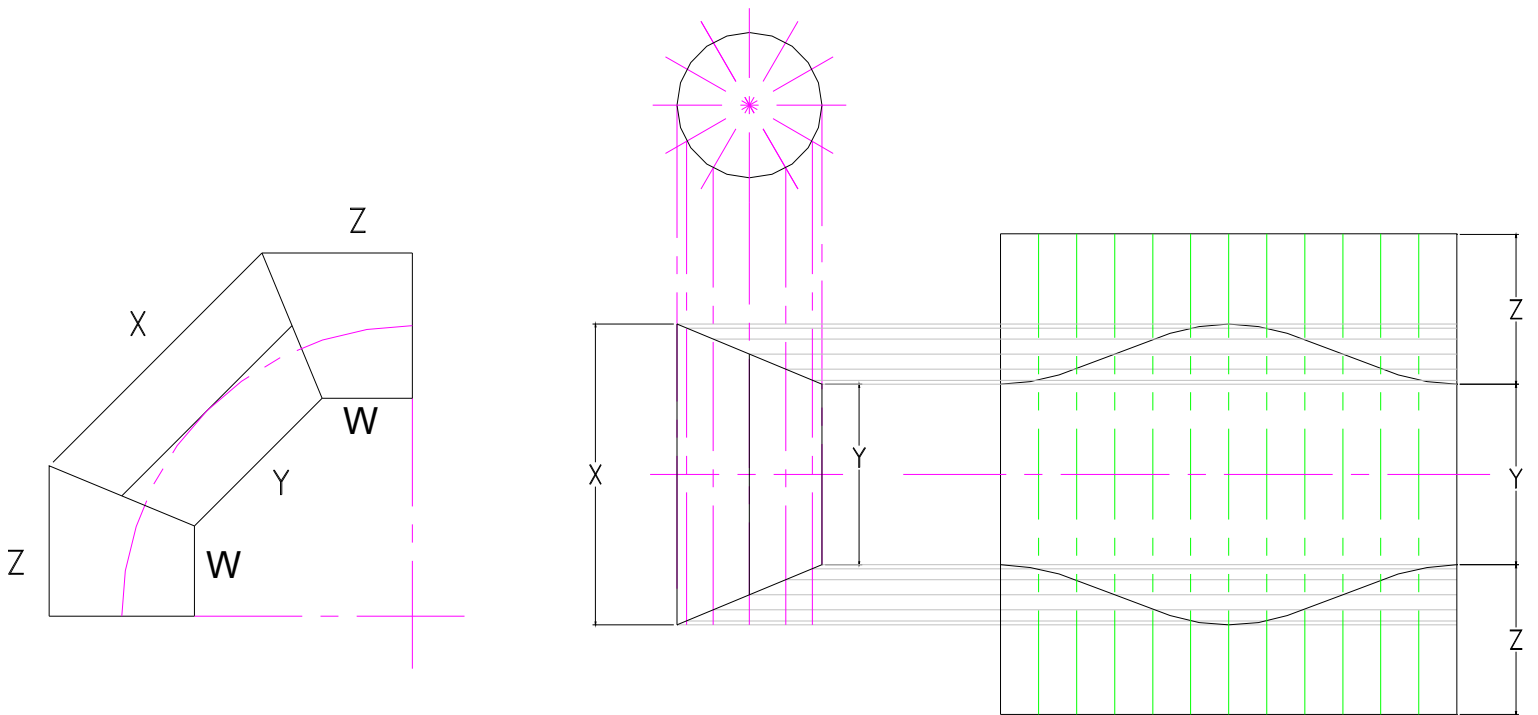
Development of elbows

- Elbows are used to make turns or corners in ductwork.
- The turns may be any number of degrees.
- Elbows may be standard 90^0 two-piece, three-piece, or four-piece elbow

- Standard 90^0 two-piece elbow

Seam

The Seam is on opposites sides from part to part to eliminate scrap.

- Standard 90⁰ three-piece elbow

Z

X

W

Y

Z

W

X

Y

Z

Y

Z

Possibles combinations for the height of the development based on the Seam specified:

W + X + W

Z + Y + Z

3. Radial Line

-- Development of Conical Surfaces

- Cones
- Truncated cones

Development of a Right Cone

- A right circular cone is symmetrical about the vertical axis
- Development is a sector of a circle
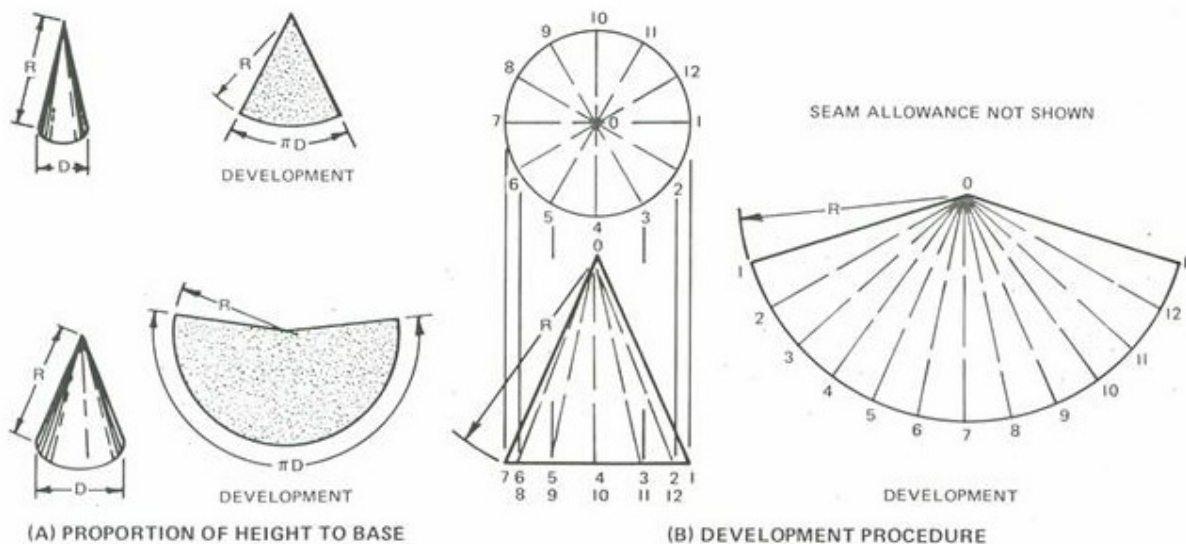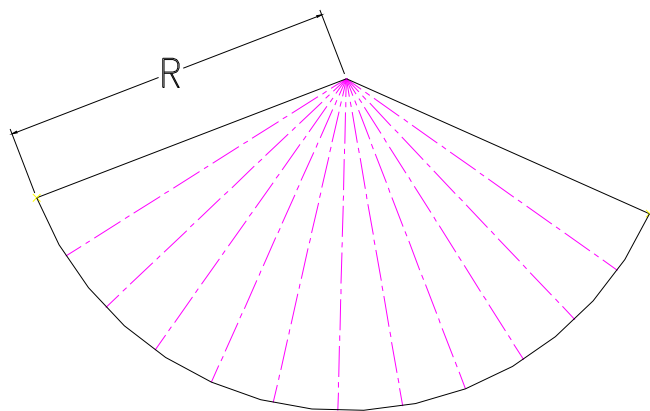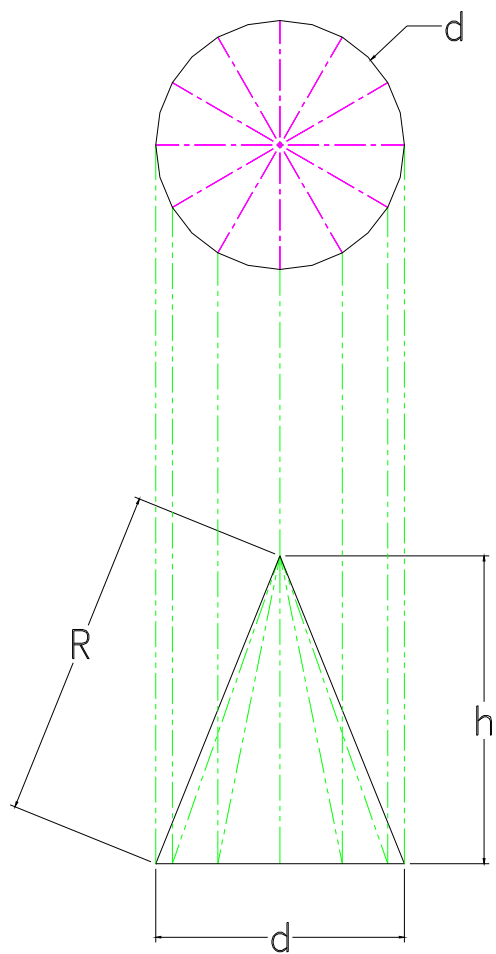- Radius is the slant height of the cone
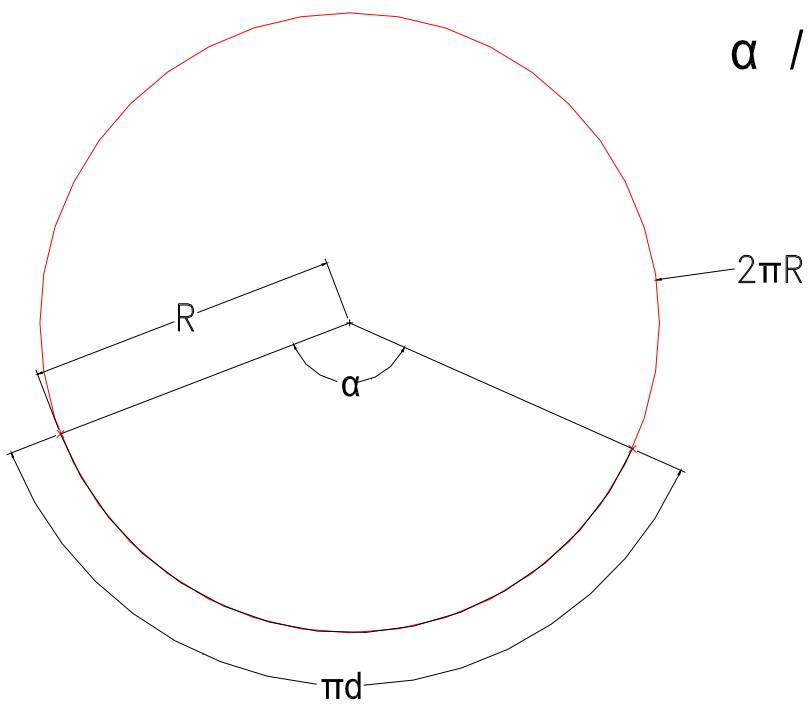- Length around perimeter is the circumference of the base

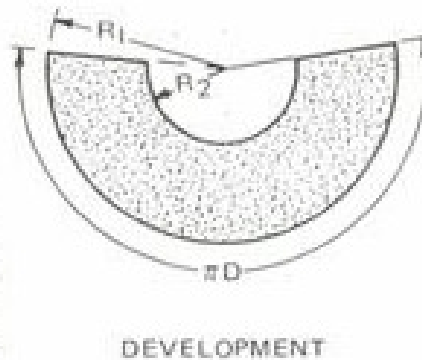FIG. 23-5-1   Development of a cone.

$$\alpha \ / \pi d = 360° \ / \ 2R\pi$$
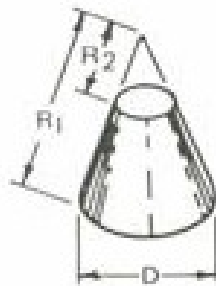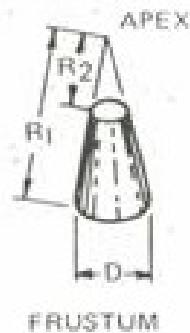
R

d

h

R

2πR

R

α

πd

Development of a Truncated Cone

The development of truncated cone is the development of a full cone less the development of the part removed.

- The frustum of a cone.
- The top of a cone is truncated at an angle to the base.

FIG. 23-5-2   Development of a truncated cone.

Given: d1, d2, h

Find: R1, R2

SEAM

5.348
3.307
3.265
3.129
2.895
2.628
2.357
2.275

5.348
3.307
3.265
3.129
2.895
2.628
2.357
2.275