

18MES101L – Engineering Graphics and Design

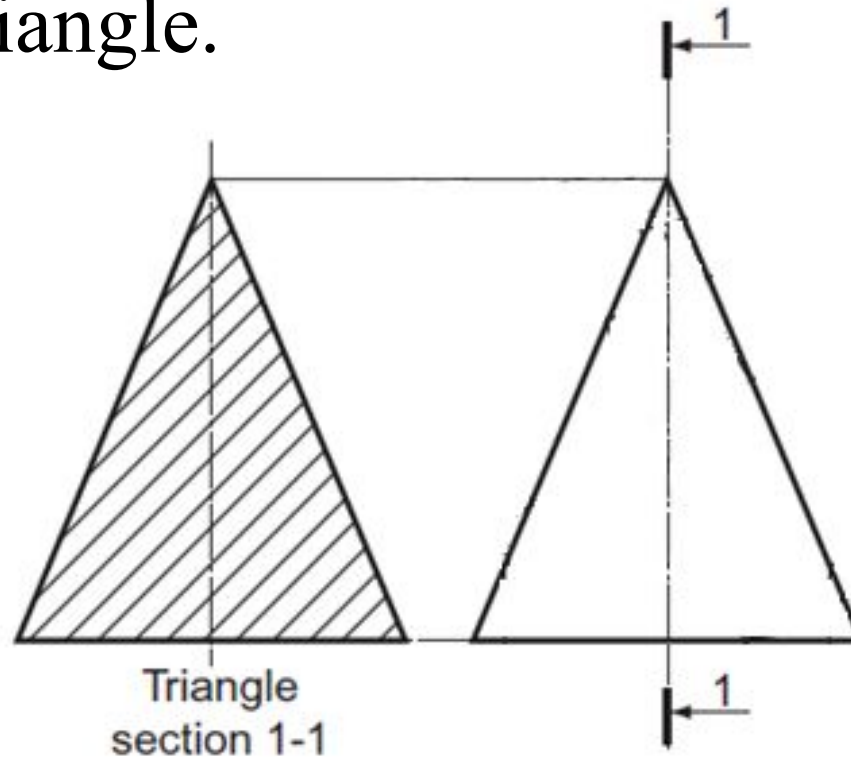
Week 2: ESSENTIALS OF ENGINEERING GRAPHICS (Conic and special curves)

Conics

- When a cone is cut by a plane, the curve formed along the section is known as a conic.
- A cone may be cut by different section planes to obtain the different conic sections.

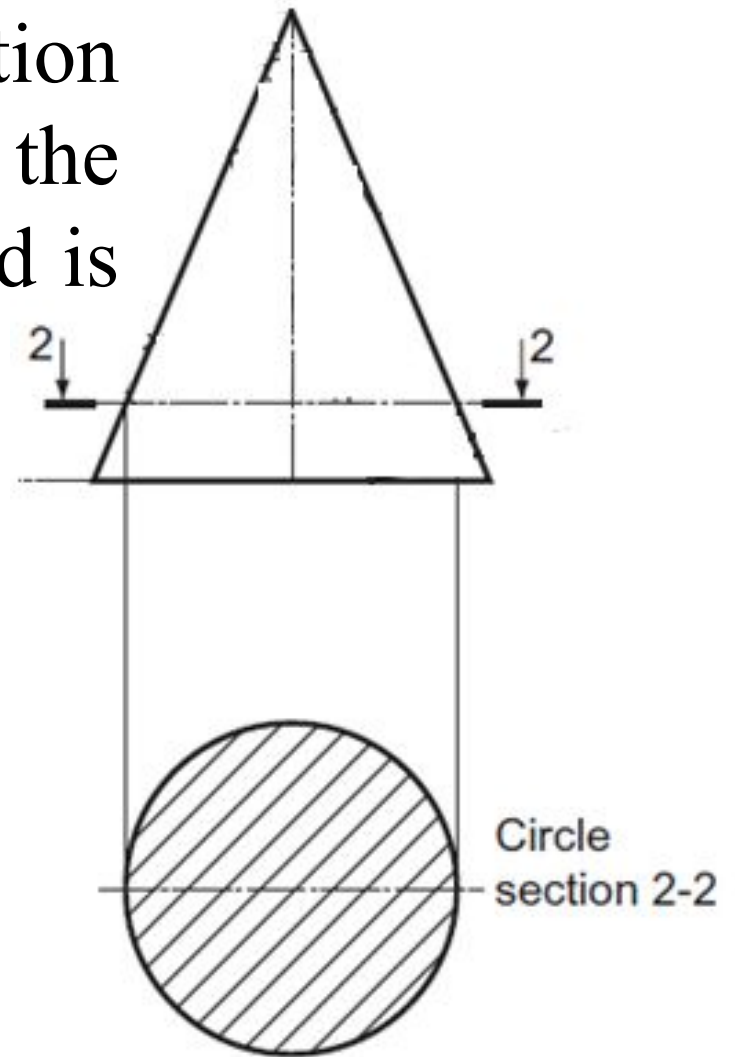
Triangle

When a cone is cut by a section plane 1-1, passing through the axis, then the section obtained is a triangle.



Circle

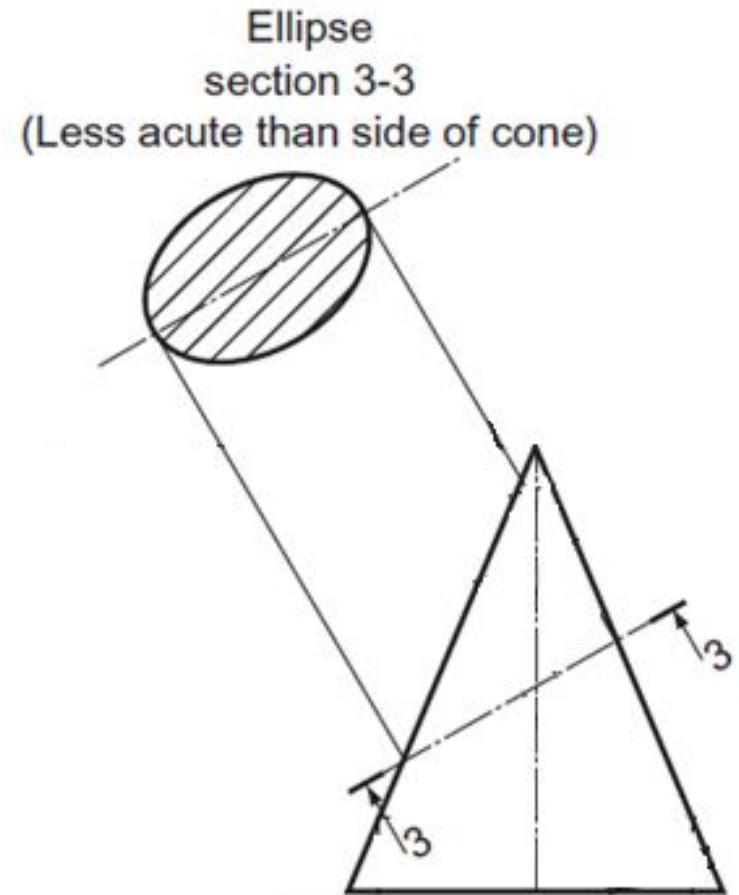
When a cone is cut by a section plane 2-2 perpendicular to the axis, then the section obtained is a circle.



Ellipse

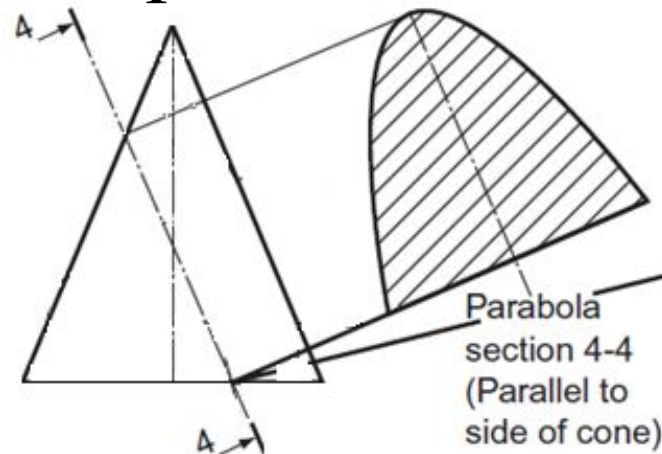
When a cone is cut by a section plane 3-3 at an angle α , $90^\circ > \alpha > \theta$ ($\frac{1}{2}$ apex angle), the curve of the section is an ellipse.

Its size depends on the angle α and the distance of the section plane from the apex of the cone.



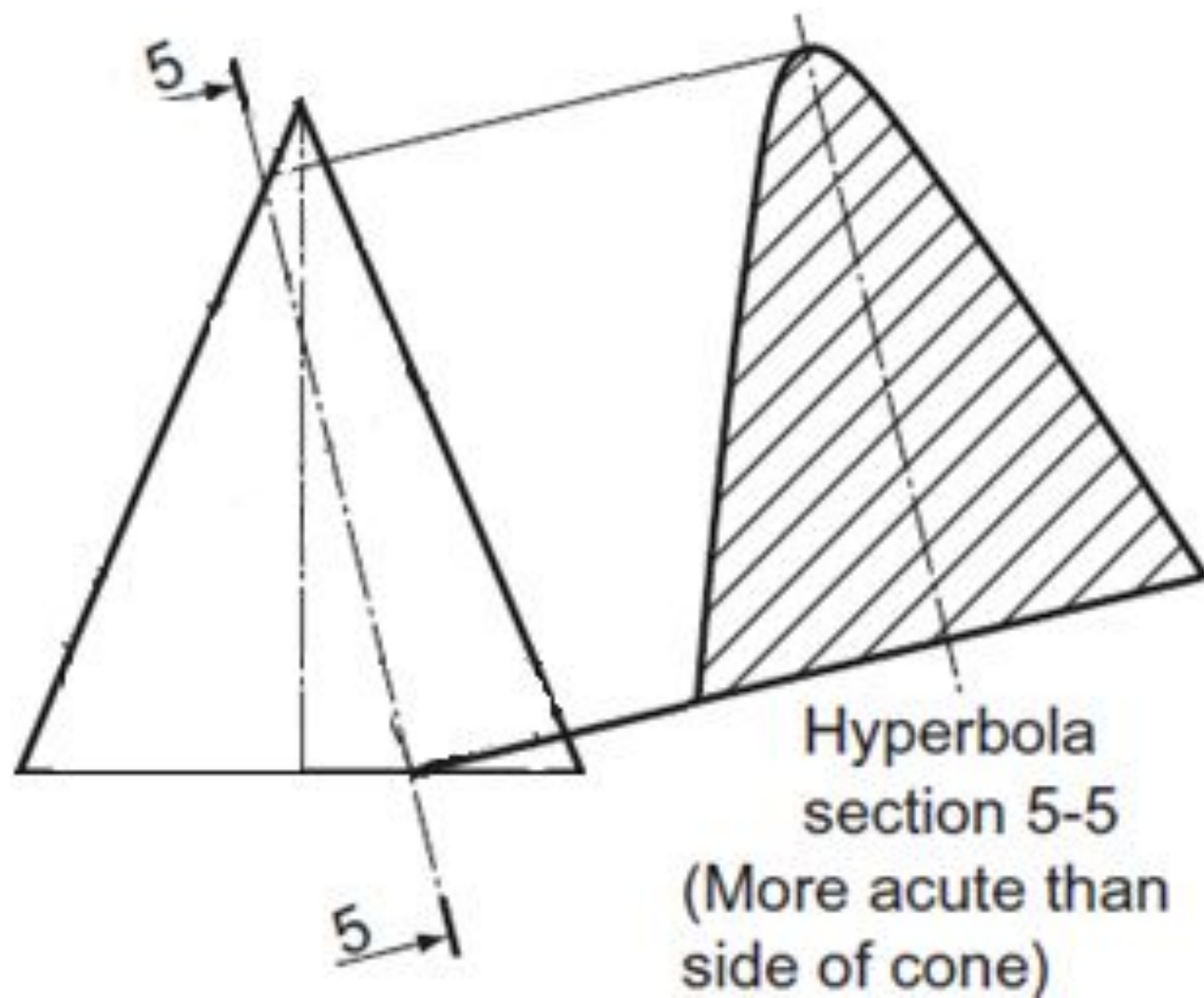
Parabola

- When a cone is cut by a section plane 4-4 parallel to the slant side of the cone, then the curve at the section is a parabola.
- This is not a closed figure like circle or ellipse.
- The size of the parabola depends upon the distance of the section plane from the slant side of the cone.

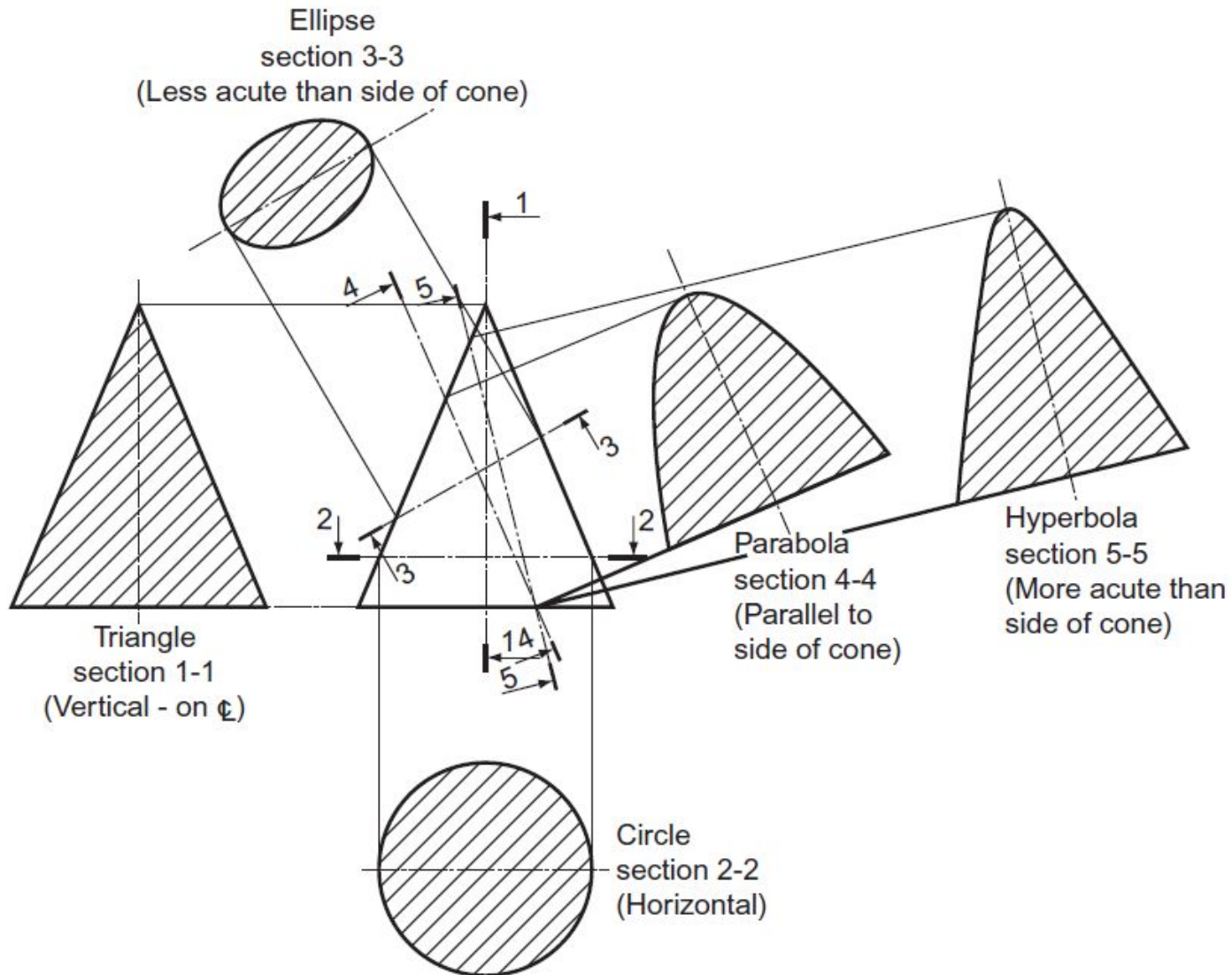


Hyperbola

- When a cone is cut by a section plane 5-5 at an angle $\alpha < \theta$ ($\frac{1}{2}$ apex angle), the curve of the section is a hyperbola.
- The section will be a hyperbola, if $\alpha = \theta$, provided the section plane is not passing through the apex of the cone.
- However if the section plane passes through the apex, the section produced is an isosceles triangle.



Conic section

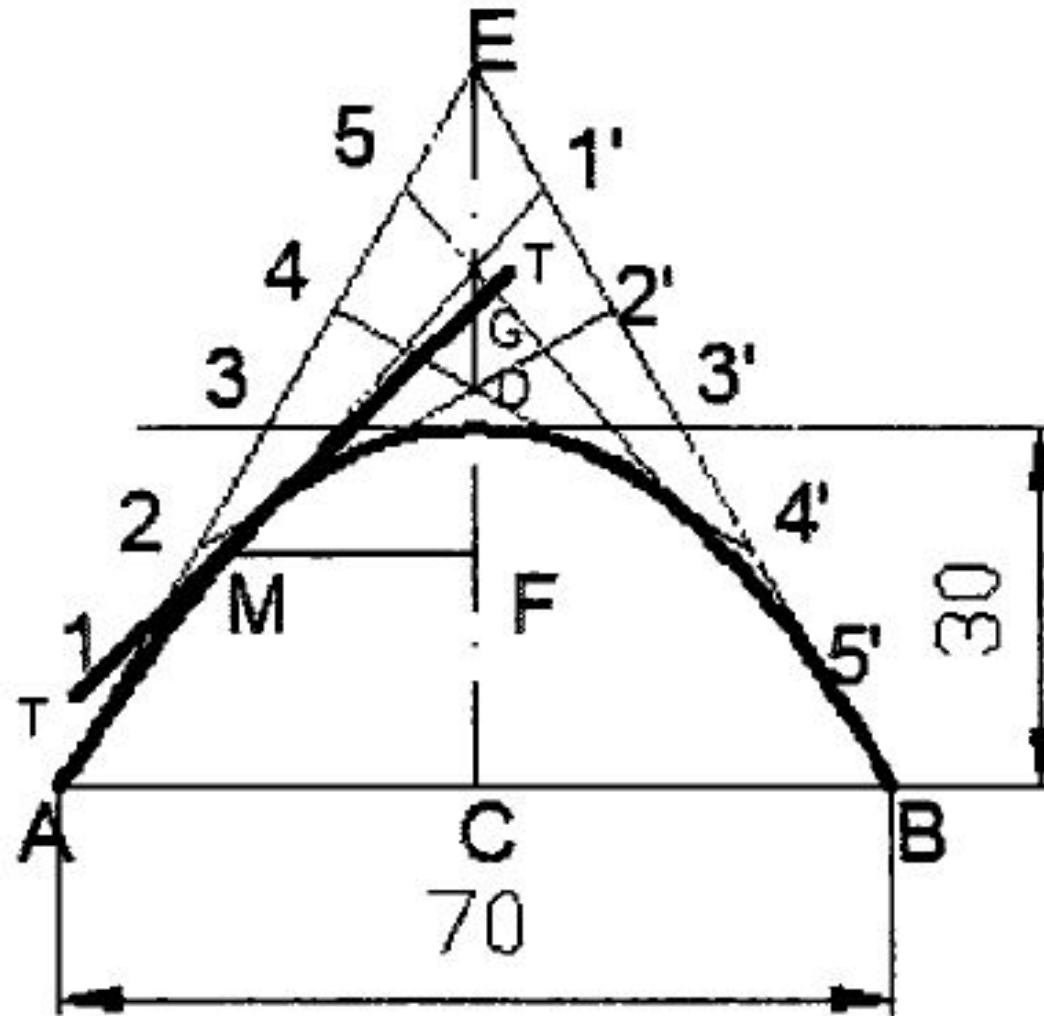


Construction of conic sections

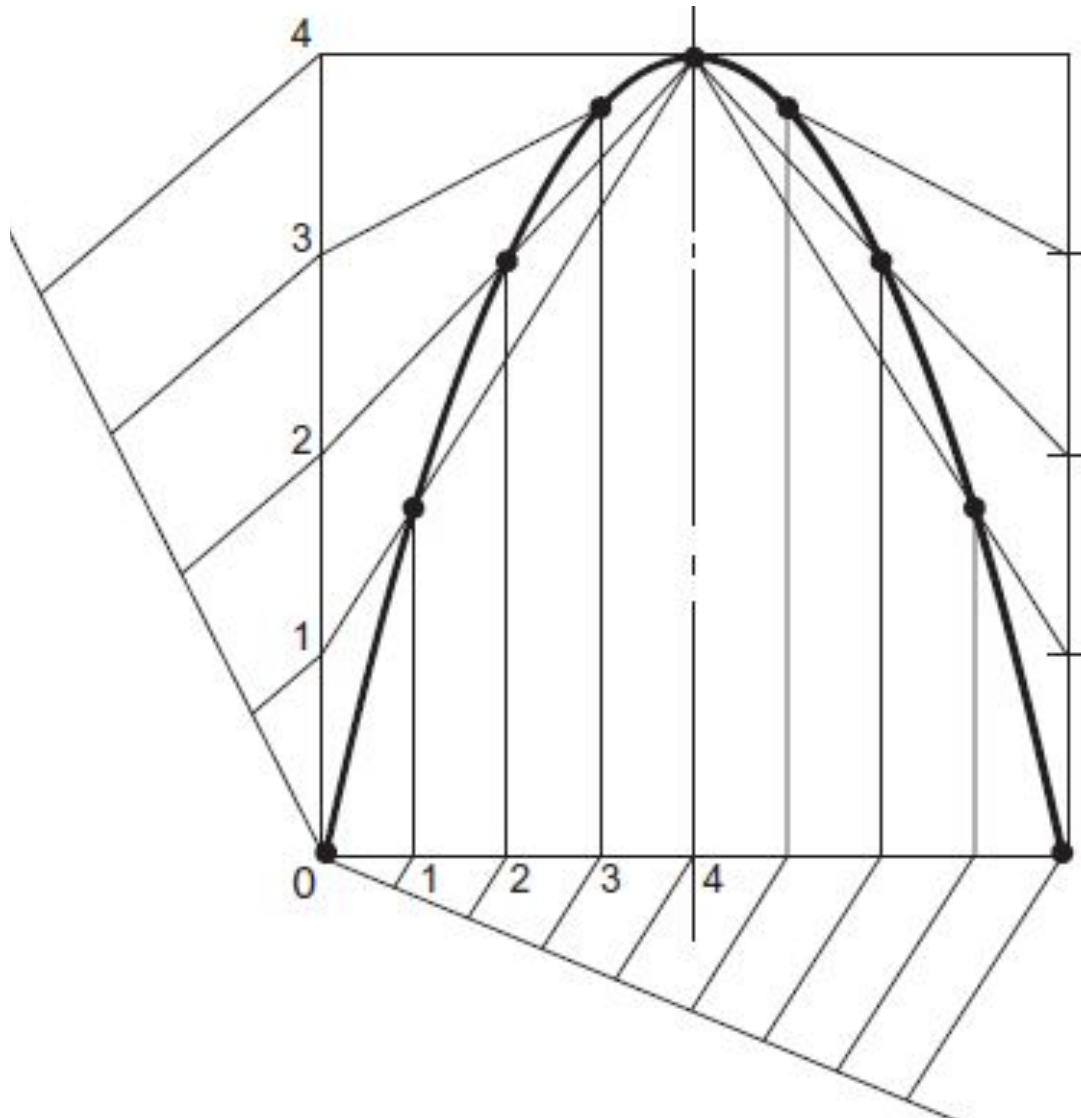
Parabola:

- Tangent method
- Rectangle method

Parabola – Tangent method



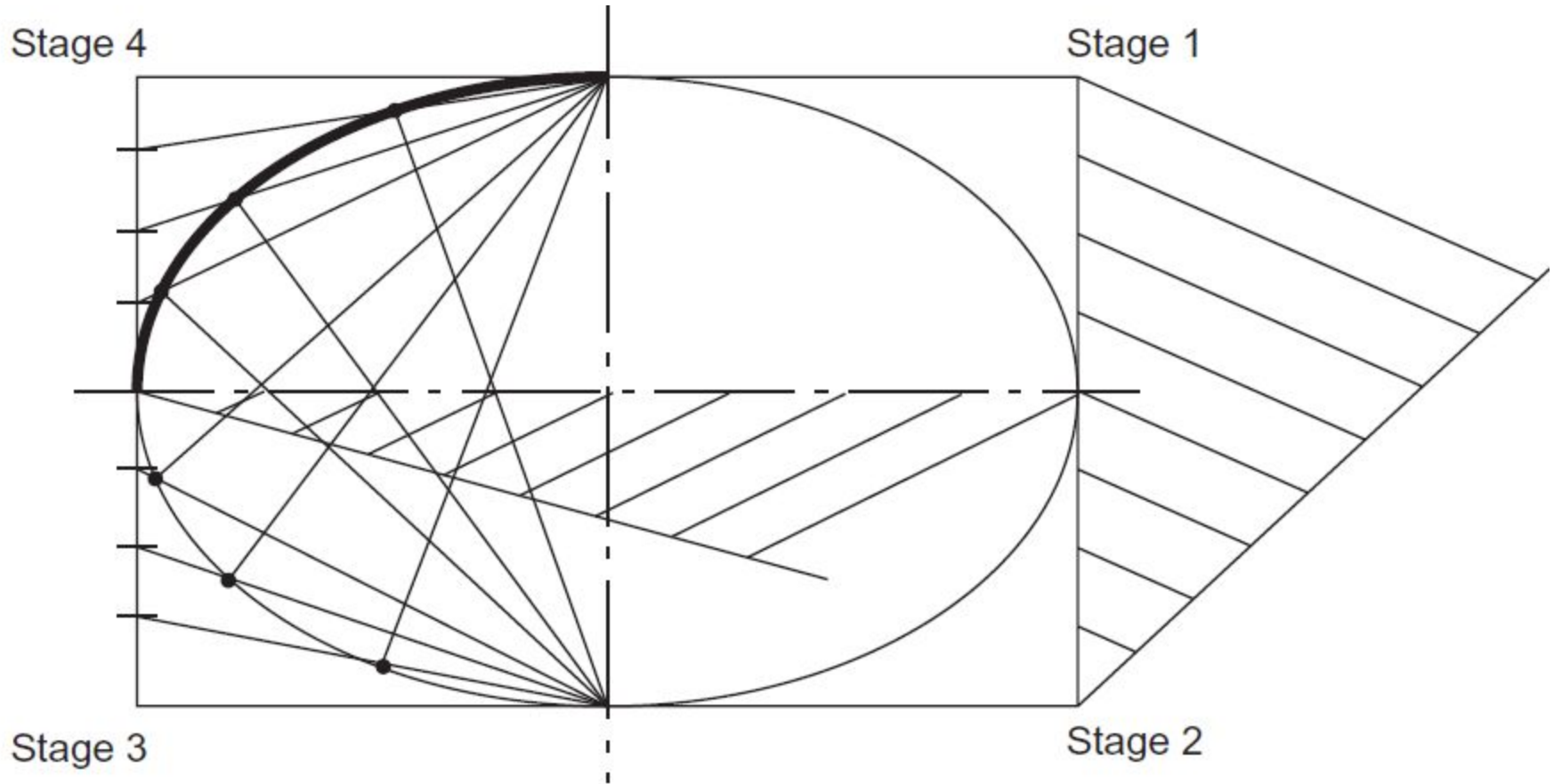
Parabola – Rectangle method



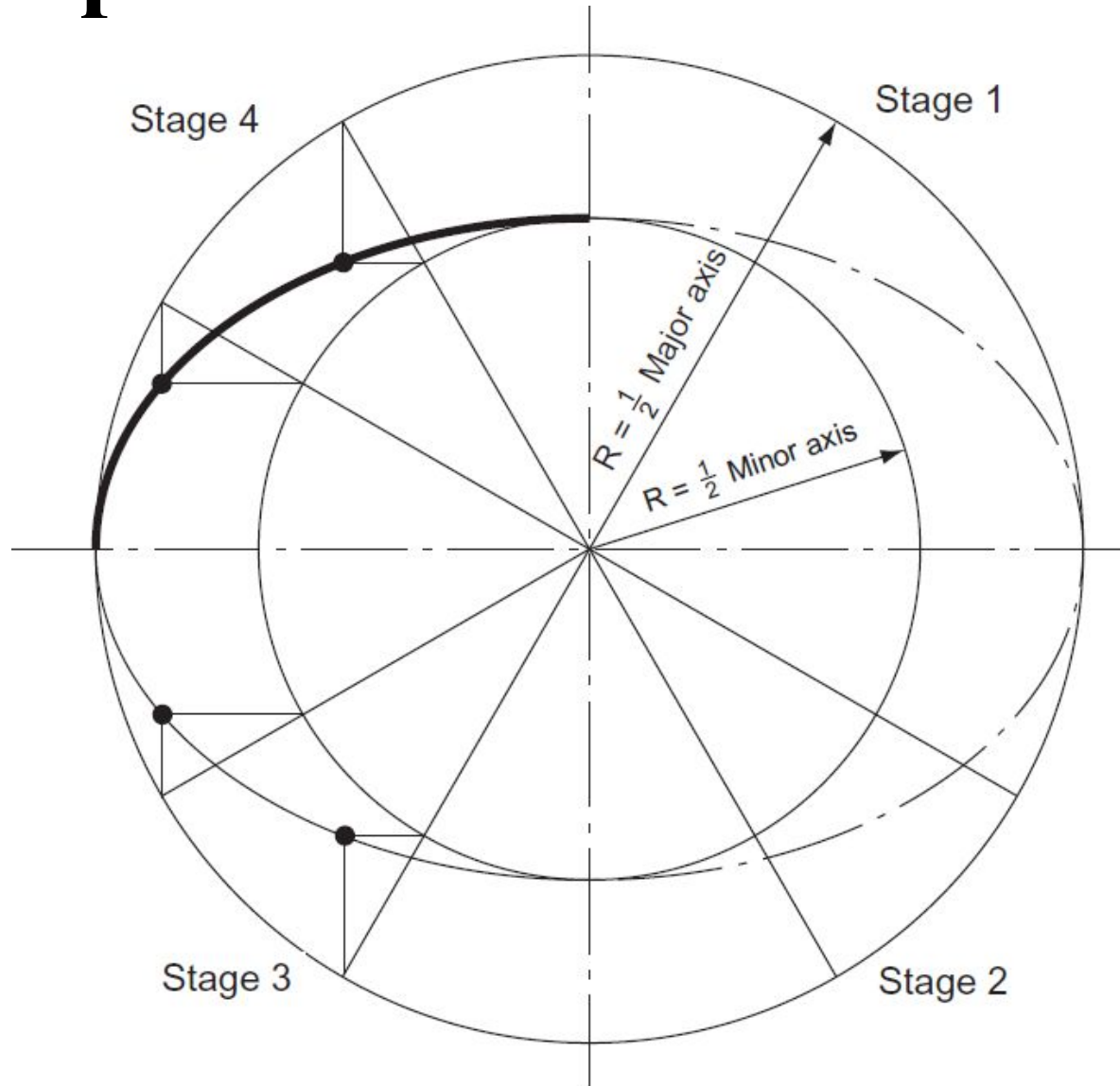
Ellipse

- Oblong method
- Concentric circle method

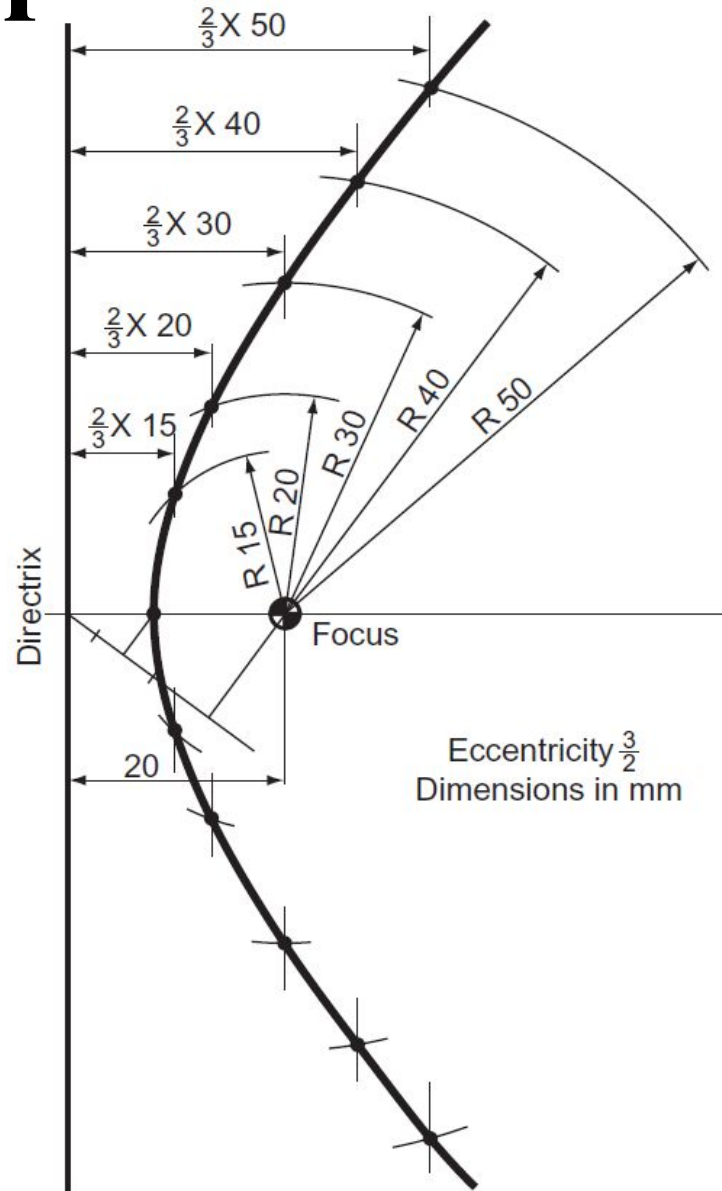
Ellipse – Oblong method



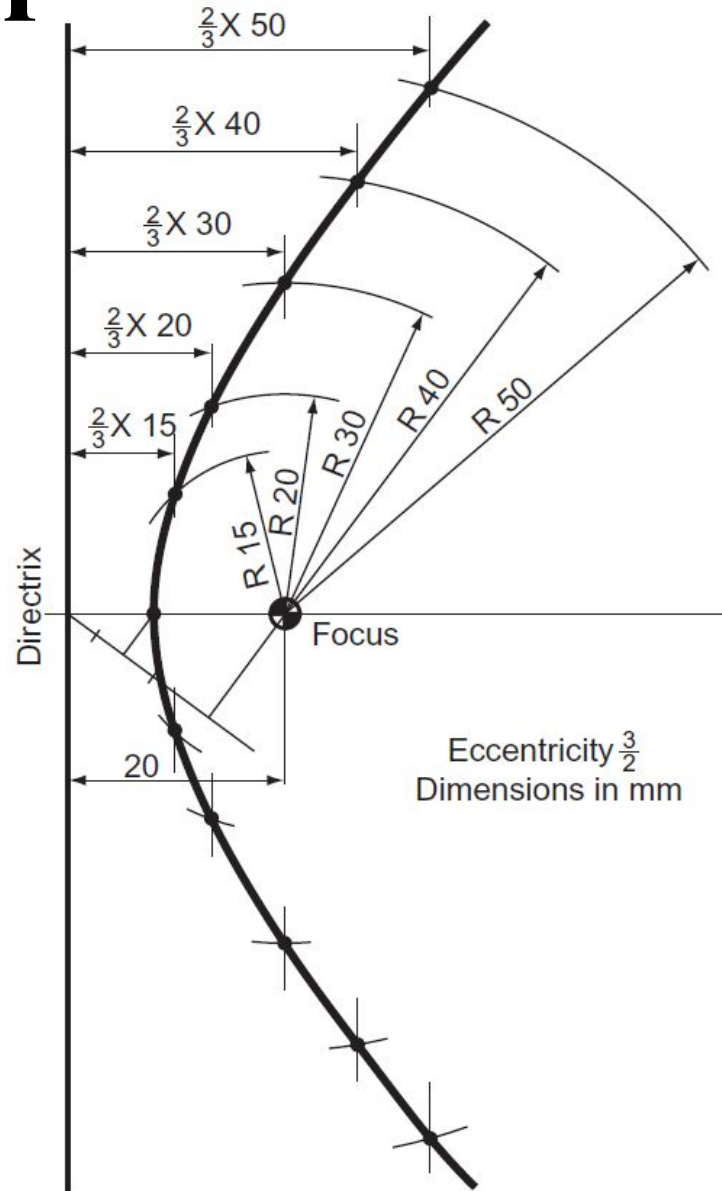
Ellipse – Concentric circle method



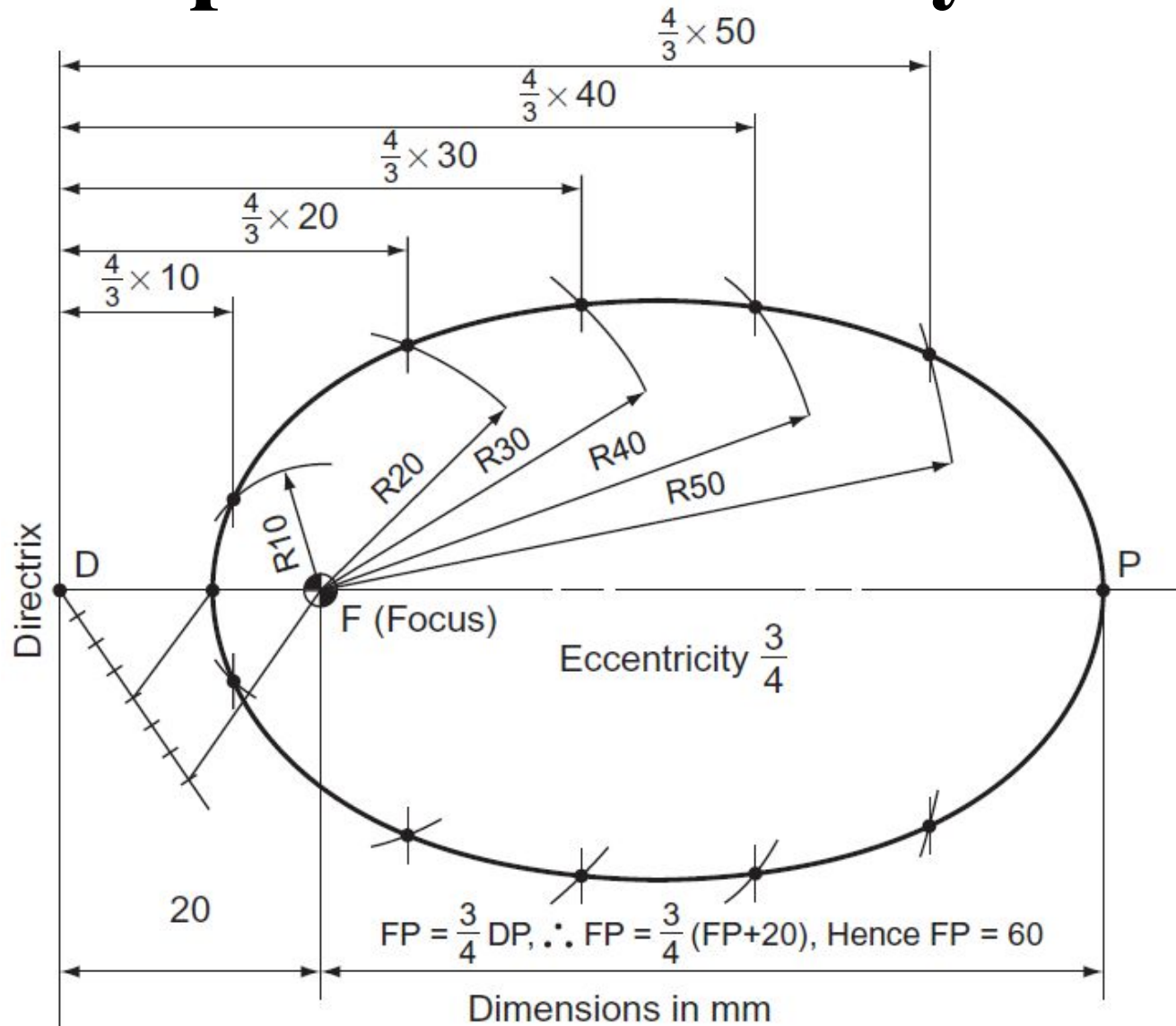
Hyperbola – Eccentricity method



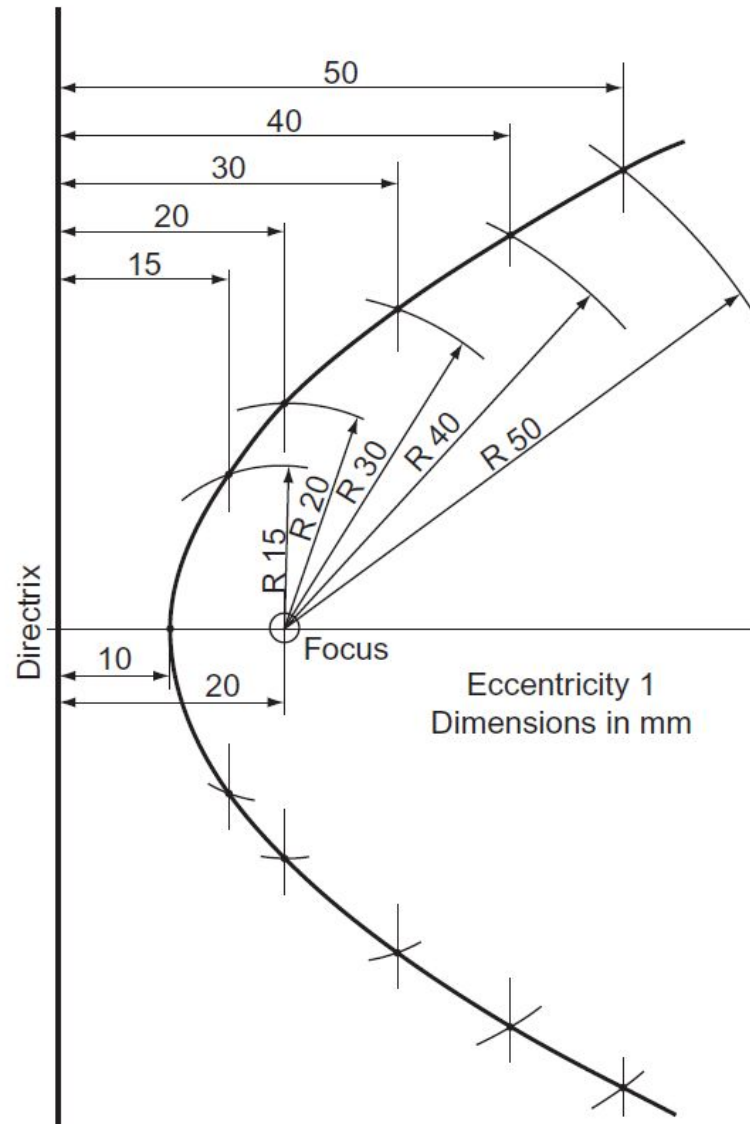
Hyperbola – Eccentricity method



Ellipse – Eccentricity method



Parabola – Eccentricity method



Special curves

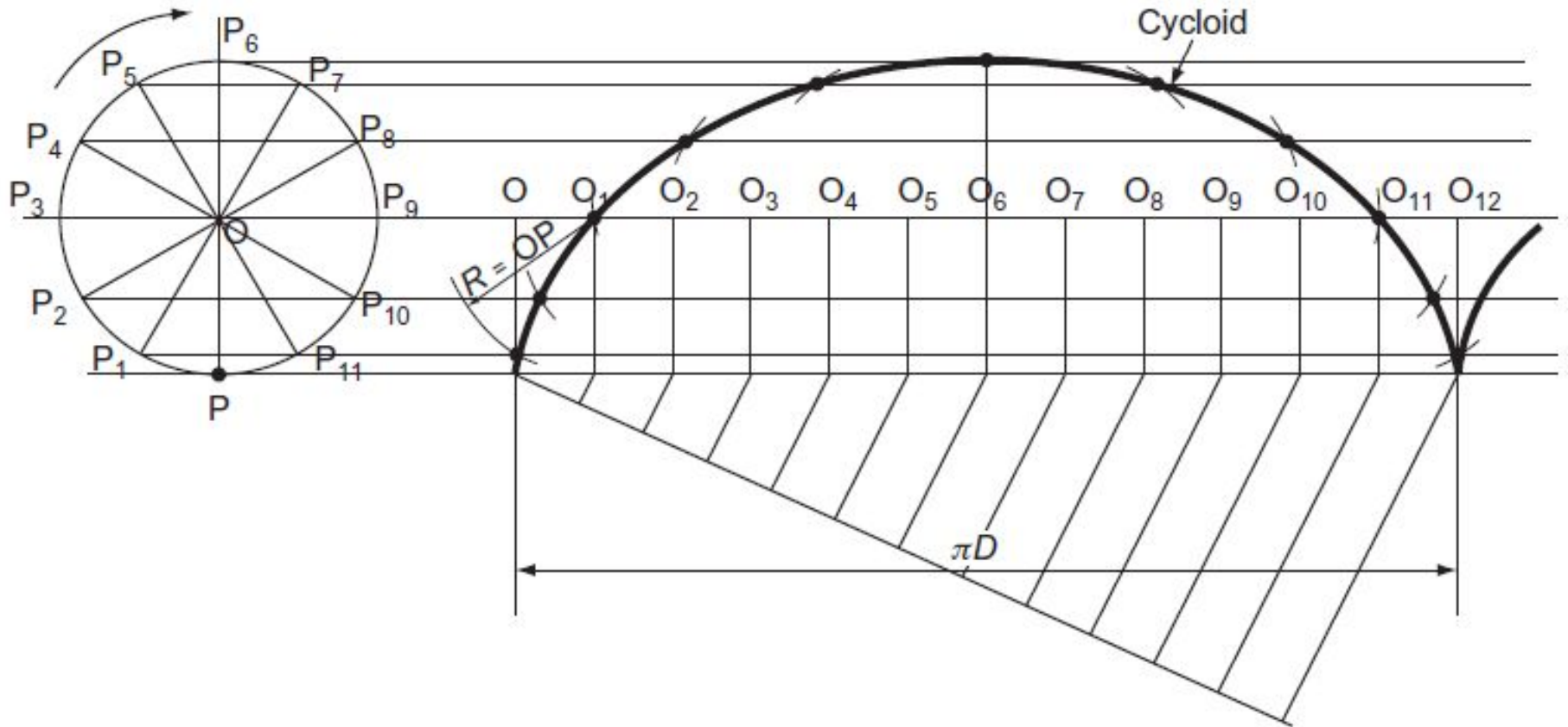
□ Cycloid

- Epi – cycloid
- Hypo – cycloid
- Trochoid
- Involute

□ Spiral

- Helix

Cycloid



Spiral

