

$$R = \frac{ep}{1 + e \sin \phi}$$

HORIZ. DIRECTRIX ABOVE POLE

$$R = \frac{ep}{1 - e \sin \phi}$$

HORIZ. DIRECTRIX BELOW THE POLE

$$R = \frac{ep}{1 + e \cos \phi}$$

VERTICAL DIRECTRIX TO RIGHT OF POLE

$$R = \frac{ep}{1 - e \cos \phi}$$

VERTICAL DIRECTRIX TO LEFT OF POLE

$0 < e < 1$  ELLIPSE

$e > 1$  HYPERBOLA

$e = 1$  PARABOLA

$e = 0$  CIRCLE

$$E = \frac{c}{a}$$

GENERAL EQUATION:

$$R = \frac{c}{A \sin \phi \pm B \cos \phi}$$

PARABOLA:

$$R = \frac{D}{1 \pm \cos \phi}$$

$$R = \frac{D}{1 \pm \sin \phi}$$

ELLIPSE

$$R = \frac{De}{1 + e \cos \phi}$$

$$R = \frac{De}{1 + e \sin \phi}$$

HYPERBOLA:

$$R = \frac{De}{1 - e \cos \phi}$$

$$R = \frac{De}{1 - e \sin \phi}$$

NOTE CURVES:

$$R = A \sin(n\phi)$$

$$R = A \cdot \cos(n\phi)$$

LIMACONS:

$$R = B \pm A \sin \phi$$

$$R = B \pm A \cos \phi$$

CARDIoids:

$$R = A \phi$$

$$R = A(1 \pm \sin \phi)$$

$$R = A(1 \pm \cos \phi)$$

CIRCLE:

$$R = A \sin \phi$$

$$R = A \cos \phi$$