THE STANDARD FORM ELLIPSE:

The ellipse $\mathcal{E}$ with horizontal major axis is described by the conditions:

$$P = (x, y) \text{ on } \mathcal{E} \iff d(P, F_1) + d(P, F_2) = 2a \iff \frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1 \iff \frac{d(P, F_1)}{d(P, D_1)} = \frac{c}{a}$$

where:
- $C = (h, k)$ is the center
- $F_1 = (h-c, k)$ and $F_2 = (h+c, k)$ are the foci
- $V_1 = (h-a, k)$ and $V_2 = (h+a, k)$ are the vertices of the major axis
- $C_1 = (h, k-b)$ and $C_2 = (h, k+b)$ are the covertices of the minor axis
- $L_{11} = (h-c, k - \frac{b^2}{a})$, $L_{12} = (h-c, k + \frac{b^2}{a})$ and $L_{21} = (h+c, k - \frac{b^2}{a})$, $L_{22} = (h+c, k + \frac{b^2}{a})$
  are the endpoints of the latera recta
- $|L_{11} L_{12}| = |L_{21} L_{22}| = \frac{2b^2}{a}$ is the focal width
- $e = \frac{c}{a}$ is the eccentricity
- $D_1 : x = h - \frac{a^2}{c}$; $D_2 : x = h + \frac{a^2}{c}$ are the directrices