Fix points $F_1 = (-c, 0)$ and $F_2 = (c, 0)$, where $c > 0$. Fix a number $a$ such that $a > c$. Then the ellipse with foci $F_1$ and $F_2$ and sum of focal radii equal to $2a$ has four equivalent definitions:

(1) $\{\text{points } P \in \mathbb{R}^2 \text{ such that } PF_1 + PF_2 = 2a\}$

(2) $\{(x, y) \in \mathbb{R}^2 \text{ such that } \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, \text{ where } a^2 = b^2 + c^2\}$

(3) $\{\text{points } P \in \mathbb{R}^2 \text{ such that } PF_1 = e \cdot \text{dist}(P, l_1), \text{ where } e = \frac{c}{a} \text{ and } l_1 \text{ is the line } x = \frac{a^2}{c}\}$

(4) $\{\text{points } P \in \mathbb{R}^2 \text{ such that } PF_2 = e \cdot \text{dist}(P, l_2), \text{ where } e = \frac{c}{a} \text{ and } l_2 \text{ is the line } x = -\frac{a^2}{c}\}$

Note that the number $e$ is called the eccentricity of the ellipse, and the line $l_1$ and $l_2$ are called the directrices of the ellipse.