


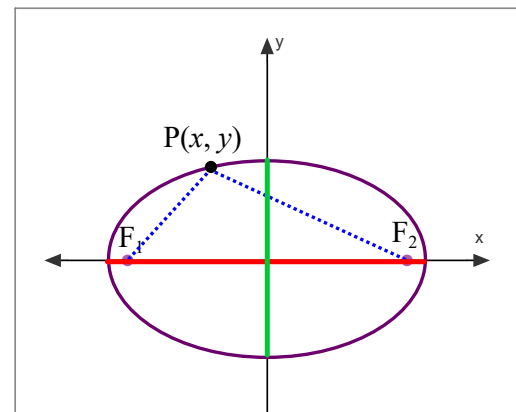
2) The Ellipse

The ellipse is the locus of all points such that the sum of the distances from two fixed points (foci) is constant.

 <http://youtu.be/7UD8hOs-val>

The ellipse has two axes:

- 1) **major** (longer)
- 2) **minor** (shorter)



$$d(P, F_1) + d(P, F_2) = \text{constant}$$

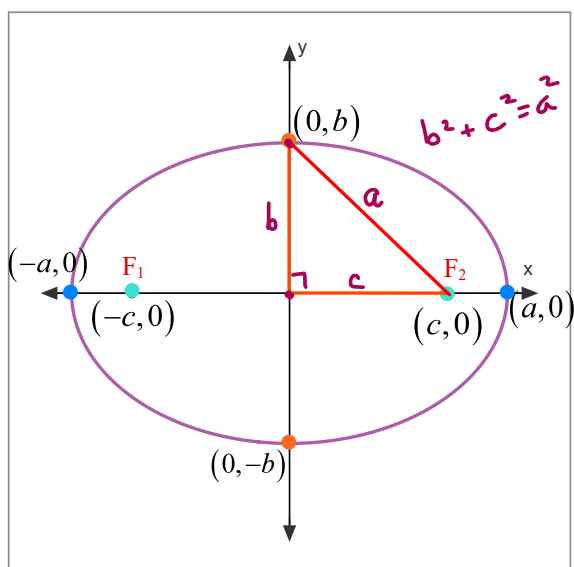
 This constant is equal to the length of the major axis.

Equation of the ellipse centred at the origin:

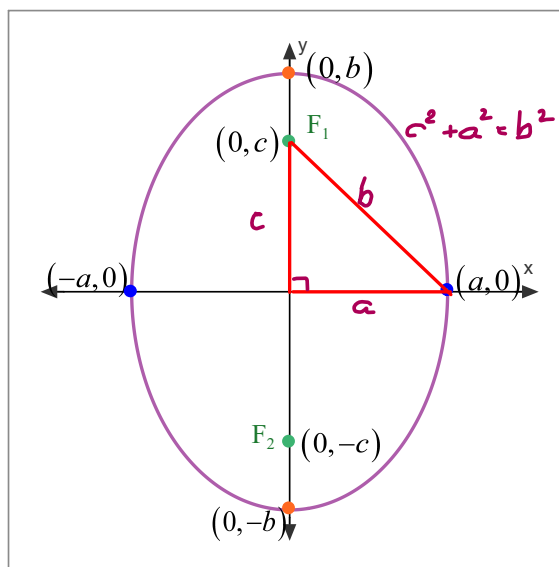
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

a = half the horizontal axis

b = half the vertical axis



The foci lie on the major axis



$\pm a = x$ - intercepts

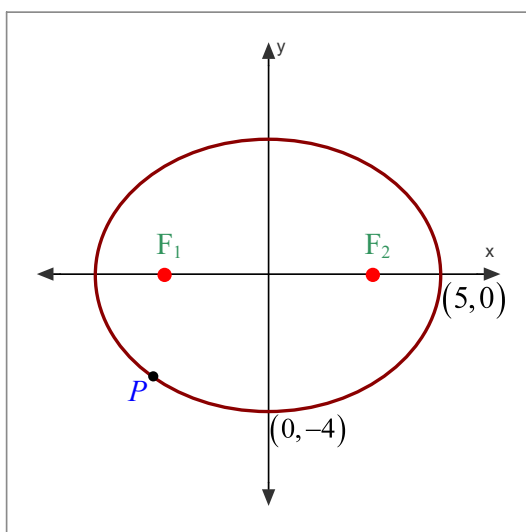
$\pm b = y$ - intercepts

$\pm c =$ coordinate of focus

To determine the coordinates of the foci:

$$\left. \begin{array}{l} c^2 = a^2 - b^2 \\ c^2 = b^2 - a^2 \end{array} \right\} \text{whichever of } a \text{ or } b \text{ is bigger} \\ \text{(major axis)}$$

Examples:



Find....

- a) length of major axis
- b) length of minor axis
- c) coordinates of foci
- d) total distance from P to both foci
- e) the equation of the locus (ellipse)