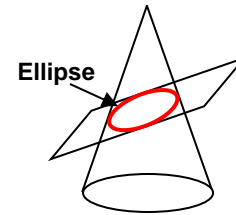


Vocabulary: Ellipses

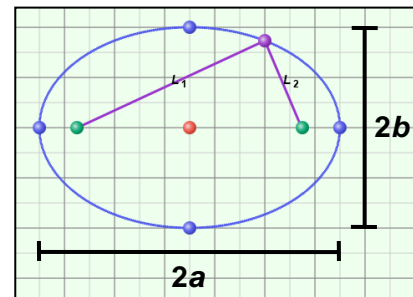


Vocabulary

- **Conic section** – a curve formed by the intersection of a plane and one or two right circular cones.
 - For example, the intersection of the plane and the cone shown to the right is an ellipse.



- **Ellipse** – the set of all points in a plane for which the sum of the distances from two fixed points, the foci, is constant.
 - For all (x, y) points on the ellipse to the right, $L_1 + L_2 = 2a$, where a is the distance from the center to one of the major axis vertices.

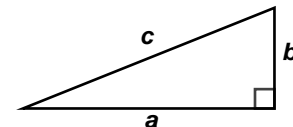


- **Foci of an ellipse (focus points)** – the two fixed points, located on the major axis, that define the ellipse.
 - The sum of the distances from these two points to any point on the ellipse is constant and equal to $2a$.

- **Major axis** – the line segment through the two foci with endpoints on the ellipse.
 - The length of the major axis is $2a$ units.

- **Minor axis** – the line segment through the center of the ellipse, perpendicular to the major axis, with endpoints on the ellipse.
 - The length of the minor axis is $2b$ units.

- **Pythagorean Theorem** – a theorem stating that, for any right triangle, $a^2 + b^2 = c^2$, where a and b are the lengths of the legs of the triangle and c is the length of the hypotenuse.



- **Standard form of the equation of an ellipse** – the equation representing a set of points in the coordinate plane for which the sum of the distances from two fixed points, the foci, is constant.

- If the major axis is horizontal, standard form is $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$.

- If the major axis is vertical, standard form is $\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$.

- In either case, the point (h, k) is the center of the ellipse, $2a$ is the length of the major axis, and $2b$ is the length of the minor axis.

- **Vertices of an ellipse** – the endpoints of the major and minor axes, located on the ellipse.