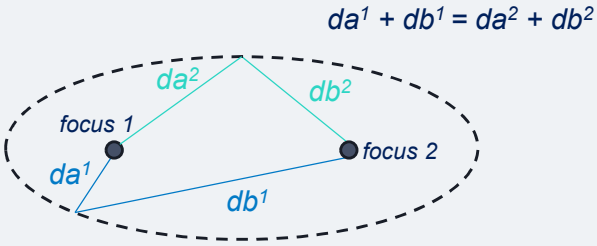
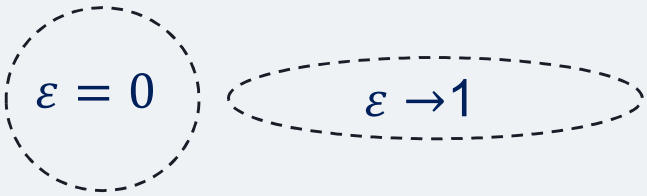
KEPLER'S LAWS FACT SHEET

PROPERTIES OF AN ELLIPSE

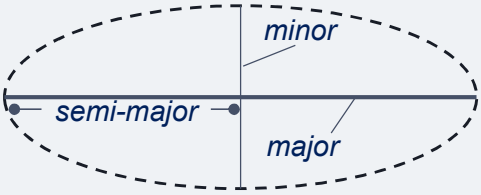
An ellipse has 2 special points called foci. If you measure the distances from any point on the ellipse to the 2 foci, the total distance is always the same.



The intensity of the elliptical shape is denoted by eccentricity (ε). Where $\varepsilon = 0$ is a circular orbit and $\varepsilon = 1$ is a parabolic orbit.

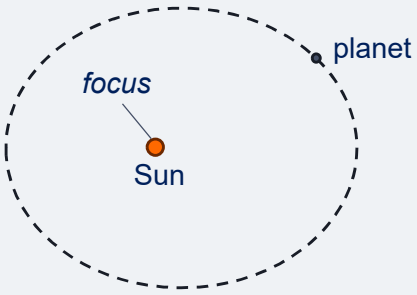


An ellipse has 2 axes. The longer one is called the major axis, and the shorter one is called the minor axis. Half of the major axis is called the semi-major axis.



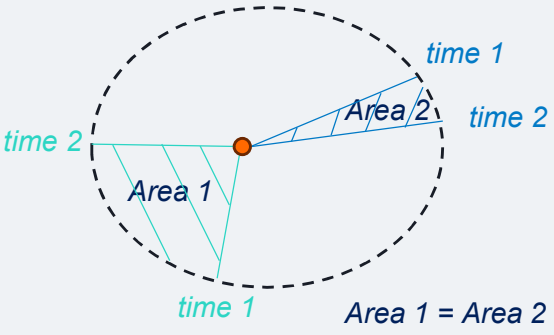
KEPLER'S 1ST LAW: THE LAW OF ORBITS

All planets in our Solar System orbit the Sun in an elliptical shape. The Sun is always at one of the foci of the ellipse.



KEPLER'S 2ND LAW: THE LAW OF AREAS

A line drawn from the centre of the Sun to the centre of an orbiting body will sweep out equal areas in equal intervals of time.



KEPLER'S 3RD LAW: THE LAW OF PERIODS

The ratio of the squares of the periods (*T*) of any two planets is equal to the ratio of the cubes of their semi-major axis (*a*) of their elliptical orbit.

This can be expressed as an equation:

$$T^2 = \frac{4\pi^2}{GM} a^3$$

This equation is simplified slightly. It assumes the mass of the planet is negligible compared to the mass of the Sun.