The cycloid is the locus of a point on the rim of a circle of radius $a$ rolling along a straight line. It was studied and named by Galileo in 1599.


A curtate cycloid, sometimes also called a contracted cycloid, is the path traced out by a fixed point at a radius $b < a$, where $a$ is the radius of a rolling circle. Curtate cycloids are used by some violin makers for the back arches of some instruments, and they resemble those found in some of the great Cremonese instruments of the early 18th century, such as those by Stradivari.


The prolate cycloid is the path traced out by a fixed point at a radius $b > a$, where $a$ is the radius of a rolling circle, also sometimes called an extended cycloid. The prolate cycloid contains loops.

Using Geometer’s Sketchpad to Support Mathematical Thinking

Adapted from Algebra in Motion by Audrey Weeks http://www.calculusinmotion.com

WHAT IF ... a wheel has a pebble stuck in its rim. As the wheel rolls along a straight path, what path will the pebble travel?

WHAT IF ... a farmer’s cart has square wheels, but as he drives it down his road, he gets a smooth ride. What does the road look like?
The hypocycloid is the curve produced by fixed point $P$ on the circumference of a small circle of radius $b$ rolling around the inside of a large circle of radius $a > b$.

An epicycloid is the path traced out by a point $P$ on the edge of a circle of radius $b$ rolling on the outside of a circle of radius $a$. An epicycloids with one cusp is called a cardioid, one with two cusps is called a nephroid.


- **Roll for Epicycloid**

\[
\frac{m \text{ rim size}}{m \text{ wheel radius}} = 2.400
\]