# Limaçon

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(Redirected from Limacon)

In mathematics, **limaçons** (pronounced with a soft *c*), also known as **limaçons of Pascal**, are heart-shaped mathematical curves. The **cardioid** is a special case, with a cusp.

They arise in polar coordinates in the form

$$r = a + b\sin\theta$$

which in Cartesian coordinates is

$$(x^2 + y^2)^2 - (a^2 + 2by)(x^2 + y^2) + b^2y^2 = 0.$$

Swapping x and y in the above equation also gives a limaçon, which in polar coordinates is.

$$r = a + b\cos\theta$$

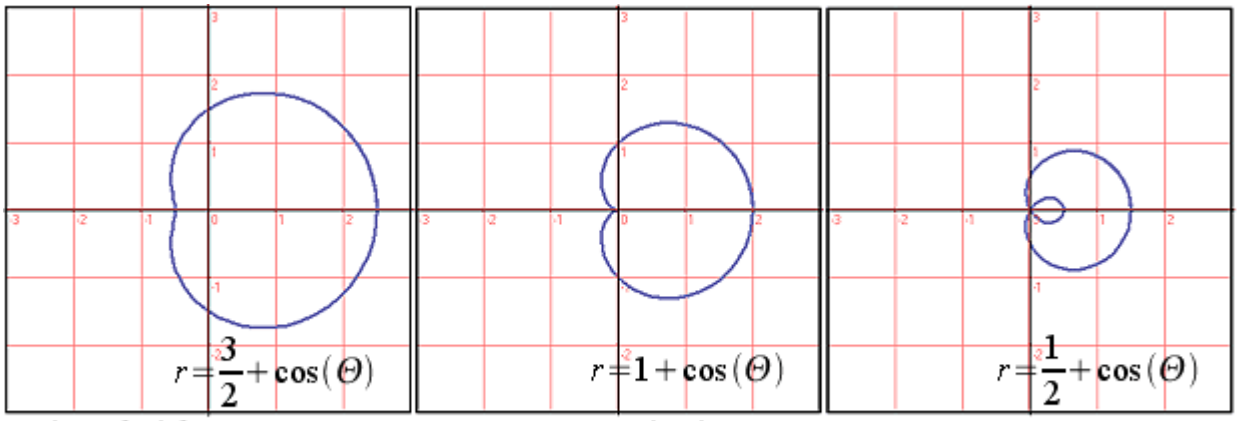
The term derives from the Latin word *limax* which means "snail".

The limaçon is a rational plane algebraic curve.

## History

Formal research on limaçons is attributed to Étienne Pascal, father of Blaise Pascal. However investigations began earlier by the German Renaissance artist, Albrecht Dürer. Dürer's *Underweysung der Messung (Instruction in Measurement)*, contains specific geometric methods for producing limaçons.

## Visualizations




a dimpled limaçon | a cardiod | limaçon with an inner loop

**Note:** the centre graph of the above image is spelled incorrectly. The correct spelling is "cardioid".

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