

Cardioid

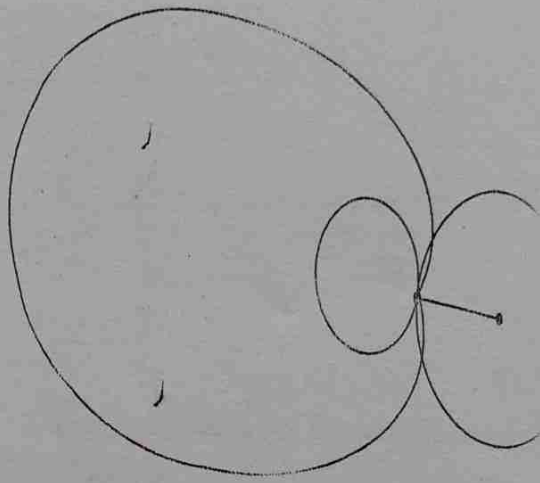
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A Cardioid is a two dimensional plane figure that has a heart - shaped curve. The word "Cardioid" originated from a Greek word, which means "heart". Hence it is called heart-shaped curve. The shape of a cardioid can be compared to the cross-section of an apple excluding it's stalk. In mathematics, we study different types of Shapes & figures. There are many two dimensional & three dimensional shapes studied in geometry. Cardioid is one of the important ones.

It is used frequently in higher mathematics and also in various other fields. The shape is formed by tracing a point on the boundary of a Circle, rolling onto another circle of same radius. In this article, we will learn in detail about Cardioid, it's equation and several other concepts based on it.

Definition of cardioid

A Cardioid is a heart-shaped plane figure. It is a curve which is defined as the locus of a point lying on the circumference of a circle that is rolling externally without any slip on the boundary of another circle of the same radius. In this way, a curve resembling the shape of a heart is formed this curve is termed as cardioids. It is a form of a sinusoidal spiral. This curve is the inverse of Parabola having



focus at the centre of inversion. A Cardioid has exactly 3 Parallel tangents with a particular gradient. It has a cusp (formed at the intersection of two branches of a curve). The length of the passing through the cusp of the cardioid is $4a$ where "a" be the circle radius. **Equation of the Cardioid** - The equation of the Cardioid is represented into polar form which can also be converted later into Cartesian Co-ordinate system.

Polar Equation of Cardioid -

$$r = a(1 + \cos \theta)$$

Cartesian Equation of Cardioid -

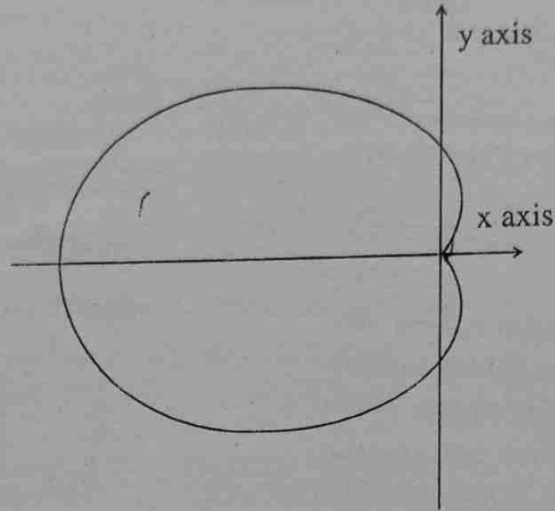
$$(x^2 + y^2 + ax)^2 = a^2(x^2 + y^2)$$

Parametric equation's are

$$x = a \cos t (1 - \cos t)$$

$$y = a \sin t (1 - \cos t)$$

Graph of Ca
Area of Card
in a two
 $Area = 6 \pi a^2$



Graph of Cardioid:

Area of **Cardioid** - Area is the region enclosed
in a two dimensional plane
 $= 6 \pi a^2$ (a radius of tracing circle)

Area of cardioid is six times equal to area of
tracing circle

Are length = $16 a$

Science is truth with her wings clipped.

AUSTIN O'MALLEY