= arctan m where m is the slope of the line in the Cartesian coordinate system . The non @-@ radial line that crosses the radial line ? =
? perpendicularly at the point (r0 , ?) has the equation
<formula>
Otherwise stated (r0 , ?) is the point in which the tangent intersects the imaginary circle of radius r0 .

Polar rose

A polar rose is a famous mathematical curve that looks like a petaled flower , and that can be expressed as a simple polar equation ,
<formula>
for any constant ?0 (including 0) . If k is an integer , these equations will produce a k @-@ petaled rose if k is odd , or a 2k @-@ petaled rose if k is even . If k is rational but not an integer , a rose @-@ like shape may form but with overlapping petals . Note that these equations never define a rose with 2 , 6 , 10 , 14 , etc. petals . The variable a represents the length of the petals of the rose .

Archimedean spiral

The Archimedean spiral is a famous spiral that was discovered by Archimedes , which can also be expressed as a simple polar equation . It is represented by the equation
<formula>
Changing the parameter a will turn the spiral , while b controls the distance between the arms , which for a given spiral is always constant . The Archimedean spiral has two arms , one for ? > 0 and one for ? < 0 . The two arms are smoothly connected at the pole . Taking the mirror image of one arm across the 90 ° / 270 ° line will yield the other arm . This curve is notable as one of the first curves , after the conic sections , to be described in a mathematical treatise , and as being a prime example of a curve that is best defined by a polar equation .

Conic sections

A conic section with one focus on the pole and the other somewhere on the 0 ° ray (so that the conic 's major axis lies along the polar axis) is given by :
<formula>