Finding area inside polar regions

Remember to find area under a curve you add up an infinite number of rectangles

Area of a rectangle = length (f(x)) \* width (dx)

To find area enclosed by a polar curve, you add up an infinite number of sectors.

Area of a sector = fraction of a circle

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Area enclosed by a polar region

Example 1: Find the area enclosed by

First sketch the graph to find what interval makes a full curve either by hand or on the calculator.



Example 2: Find the area within .



Example 3: Find the area inside

Use symmetry; find the area of one petal, them multiply by 4.

Example 4: Find the area inside the small loop of

Be careful! = inner + outer loop . The inner loop lays on top of outer loop.

Remember to find the area between curves on a rectangular grid:

To find the area between curves on the polar grid:



Example 5: Find the area inside , but outside .

Just like finding areas between Cartesian curves, the limits of integration are the intersection of the curves.

Example 6:

Find the area enclosed by and .

This is a piecewise area problem!

Try:

1. Find the area of the region inside and outside .

2. Find the area of the region inside and

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