Calc 2
Area of a Looped Limacon

Not Using Symmetry	Using Symmetry
Normal Area of Everything	Normal Area of Everything
$$\frac{1}{2}\int_0^{2\pi} r^2 d\theta - \frac{1}{2}\int_{start\ of\ loop}^{end\ of\ loop\ using\ reference\ angle} r^2 d\theta$$	$$2\cdot\frac{1}{2}\int_{0\ or\ neg\ begining\ of\ loop}^{start\ of\ loop} r^2 d\theta$$
Area In Between	Area In Between
$$\frac{1}{2}\int_0^{2\pi} r^2 d\theta - 2\cdot\frac{1}{2}\int_{start\ of\ loop}^{end\ of\ loop\ using\ reference\ angle} r^2 d\theta$$	$$2\cdot\frac{1}{2}\int_{0\ or\ neg\ begining\ of\ loop}^{start\ of\ loop} r^2 d\theta - 2\cdot\frac{1}{2}\int_{start\ of\ loop}^{halfway\ pt\ of\ loop} r^2 d\theta$$
Area of Inner Loop	Area of Inner Loop
$$\frac{1}{2}\int_{start\ of\ loop}^{end\ of\ loop\ using\ reference\ angle} r^2 d\theta$$	$$2\cdot\frac{1}{2}\int_{start\ of\ loop}^{halfway\ point\ of\ loop} r^2 d\theta$$