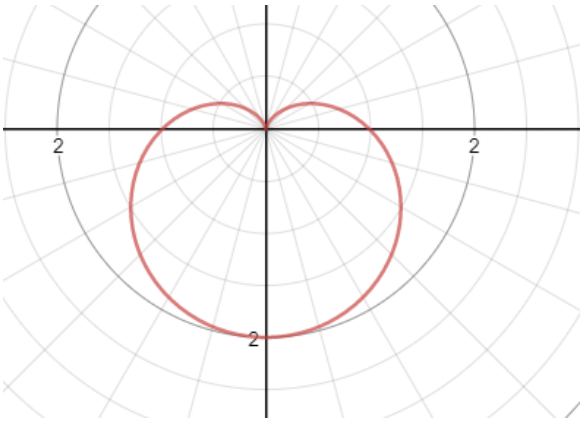
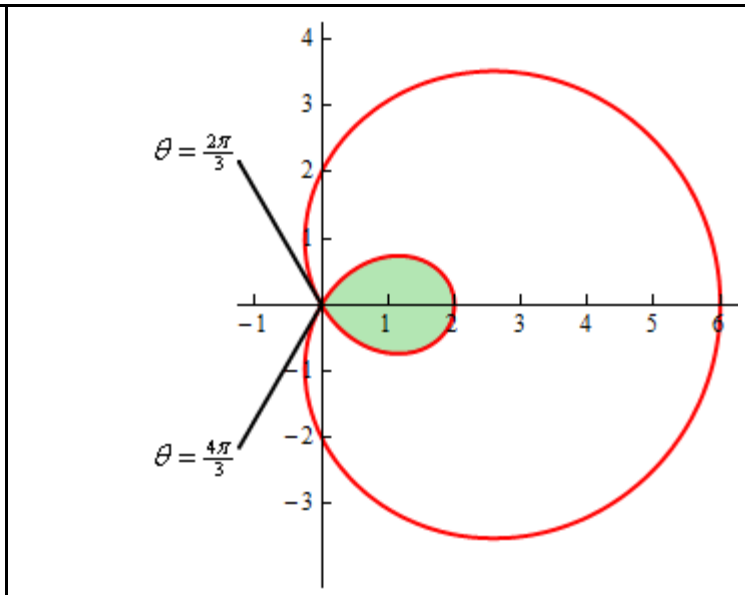
CG - Polar Coordinates

How can you convert from polar to Cartesian and vice versa?	**Key point** To convert from polar to Cartesian, use $r^2 = x^2 + y^2$ $\tan\theta = \frac{y}{x}$ $\cos\theta = \frac{x}{r} = \pm\frac{x}{\sqrt{x^2+y^2}}$ $\sin\theta = \frac{y}{r} = \pm\frac{y}{\sqrt{x^2+y^2}}$ [Choose + or – depending on whether r is positive or negative] To convert from Cartesian to polar, use $x = r\cos\theta$ $y = r\sin\theta$
What symmetries are there under polar coordinates?	1. If r is a function of cos only - symmetrical about initial line. 2. If r is a function of sin only - symmetrical about θ = π/2.
How do tangents work under polar coordinates?	If r → 0 as θ → α, the line θ = α is a tangent to the curve at this pole. Example: 
What 2 things should you note when integrating polar curves?	1. You may end up with negative areas. 2. You can use symmetries to help find areas


$\theta = \frac{2\pi}{3}$
$\theta = \frac{4\pi}{3}$
4
3
2
1
−1
1
2
3
4
5
6
−1
−2
−3