Group: _____   Present: _____

1. Investigate the cardioid $r = 2 + 2\cos(\theta)$.

   Trace to find when $r = 1$ $\theta =$ _____

   Confirm algebraically: $2 + 2\cos(\theta) = 1$ for which θ?

   Trace to find when $r = 0$ $\theta =$ _____

   Trace to find when $r = 2$ $\theta =$ _____

   Trace to find when $r = 3$ $\theta =$ _____

   Trace to find when $r = 4$ $\theta =$ _____

2. Investigate the limaçon of Pascal $r = 1 + 2\cos(\theta)$.

   Algebraically find when $r = 0$:

   For which θ values is $r < 0$?   _____ $\leq \theta \leq$ _____   (trace!)

3. Investigate the 3-petal rose $r = 3\sin(3\theta)$.

   Number of petals = _____

   Find when $r = 0$:

   Compare with $r = 3\sin(4\theta)$

   Number of petals = _____

4. Investigate the lemniscate of Bernoulli $r = \sqrt{\cos(2\theta)}$.

   When is $r = 0$?

   Find the angles θ for which $\cos(2\theta)$ is non-negative. (You should consider 2θ in the interval $[0, 4\pi]$.)

   Does your answer confirm what you see on your graph?