## Takehome Quiz $4 \quad$ Calc $2 \quad$ Due 4/12/24

Each question is worth 5 points.Open book, open notes, open neighbor, open internet, just try to understand what you do. Show good justification for full credit.

1. Plot the cycloid with equations $x(t)=r(t-\sin t), y(t)=r(1-\cos t)$ for various values of $r$. Find the area under one arch of the cycloid.
2. Find the length of the cycloid from \#1.
3. Produce a good graph of the curve with parametric equations $x(t)=t^{2}+t+1, y(t)=$ $3 t^{4}-8 t^{3}-18 t^{2}+25$, one that includes all places where the tangent lines are vertical or horizontal. Give exact coordinates for those places.
4. Figure out what's going on with the graphs of $r=\cos k \theta$ for various integer values of $k$ and describe the pattern. Compare this to $r=\sin k \theta$.
5. Describe the family of curves with polar equations $r=1+c \sin \theta$. What effect does the value of $c$ have on the shape?
