Takehome Quiz 4Calc 2Due 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 $x(t) = t^2 + t + 1$, $y(t) = 3t^4 - 8t^3 - 18t^2 + 25$, 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?