

**Math 474 HW #1**  
Due 2:00 PM Friday, Aug. 30

1. A circular disk of radius 1 in the  $xy$ -plane rolls without slipping along the  $x$ -axis. A point on the rim of the disk traces out a curve called a *cycloid*.
  - (a) Find a parametrization  $\alpha(t)$  for the cycloid.
  - (b) What is the length of the portion of the cycloid corresponding to one complete revolution of the disk?
2. (Shifrin Problem 1.1.1) Parametrize the unit circle (except the point  $(-1, 0)$ ) in terms of the variable  $t$  shown below.

