Preface

Here are a set of problems for my Calculus I notes. These problems do not have any solutions available on this site. These are intended mostly for instructors who might want a set of problems to assign for turning in. I try to put up both practice problems (with solutions available) and these problems at the same time so that both will be available to anyone who wishes to use them.

Arc Length with Polar Coordinates

For problems 1 – 3 determine the length of the given polar curve. For these problems you may assume that the curve traces out exactly once for the given range of $\theta$.

1. $r = \frac{1}{\cos \theta}$, $0 \leq \theta \leq \frac{\pi}{3}$

2. $r = \theta^2$, $0 \leq \theta \leq 3\pi$

3. $r = 6\cos \theta - 3\sin \theta$, $0 \leq \theta \leq \pi$

For problems 4 – 6 set up, but do not evaluate, an integral that gives the length of the given polar curve. For these problems you may assume that the curve traces out exactly once for the given range of $\theta$.

4. $r = \sin(\theta^2)$, $0 \leq \theta \leq \pi$

5. $r = \cos(1 + \sin \theta)$, $0 \leq \theta \leq 2\pi$

6. $r = e^{-\frac{1}{2}\theta} \cos \theta$, $0 \leq \theta \leq 3\pi$