

# MATH 495: KNOT THEORY, HOMEWORK 1

## EQUIVALENCE OF KNOTS

**Due at start of class, Tuesday, 2/4**

Problems (to turn in).

- (1) Suppose a knot lies in a plane and bounds a convex region in the plane. (Convex means that any segment with endpoints in the region is entirely contained in the region.) Prove that the knot is equivalent to a knot with three vertices.
- (2) Generalize the argument given in class to show the following: Given a knot  $K$ , there is a positive constant  $\epsilon_K$  such that if every vertex of  $K$  is moved a distance less than  $\epsilon_K$ , then the resulting knot is equivalent to  $K$ .
- (3) Show that every knot with exactly four vertices is unknotted. (Unknotted means equivalent to a knot with 3 vertices)