LECTURE 2

Q. Show that ⊗ ~ ⊗

* Read the associated sections in the book
  eg. Pg 4 "Unsolved Problem" is now solved!
    - Khovanov Homology (exp time)
    - Marc Lackenby (in quasi-polynomial time)

We like to see patterns and similarities between among knots.
Today: some commonly studied classes of knots & links.

Some more terms we'll need in this course:

- alternating knot
  - a binary knot invariant: {alt, not alt}
  - K is alternating if ∃ a diagram D of K that is alternating
  - incidentally, a good way to draw something definitely knotted!

- link, disjoint union of links $L_1 \amalg L_2$
  - Reidemeister's theorem works for link diagrams too

Knot Composition

- composition of knots, like "+" for integers "K # J"
  - define by starting with $K \amalg J$, then draw an untwisted band

- composite knots, factor knots, prime knots

  - Is the unknot composite?
    (we'll use surfaces to show the unknot is prime)

  - Compare square knot and granny knot (granary?)

  - knot tables only tabulate prime knots (like prime #s)

- <u>Recall</u> "Group" from abstract algebra: has
  group operation, identity element, and inverse

  - composition is commutative (why? example proof
    with helpful schematics)

  - we'll talk about this later in the course; short answer: No.
    Related to why unknot is prime.