Knot Theory - Math Club

September 2017

1 Problems

1. Prove/show that there are no knots with one or two crossings. ***Hint: to prove this, attempt to construct a knot with only one crossing. What happens?***

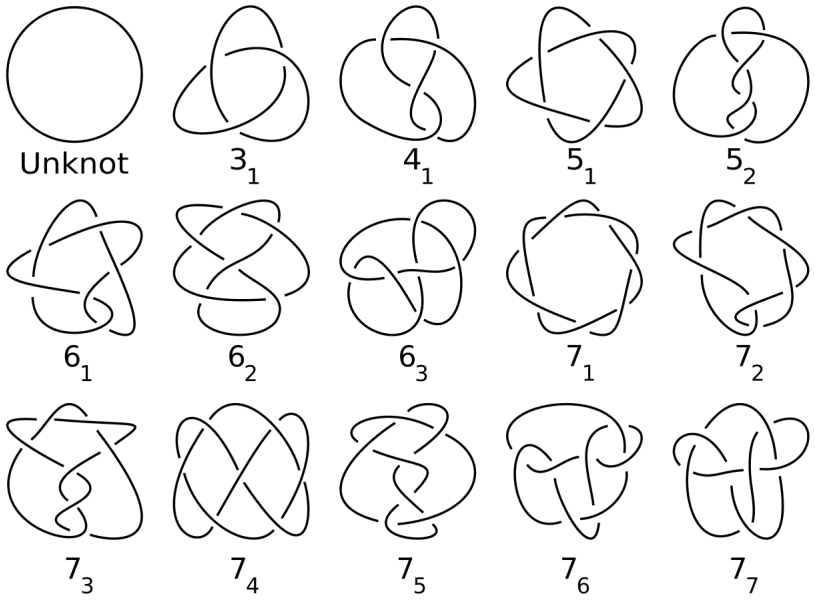
2. Can any knot have 1000 crossings? n crossings, where $n \geq 3$, $n \in N$? If so prove it.

3. Is a cube topologically equivalent to a sphere? Is a milk jug topologically equivalent to a sphere?

4. Topologically, is a cube two or three dimensional? ***Hint: consider the dimensionality of a knot***

5. Prove that the unknot is an alternating knot.

6. ***Challenge Problem*** How could you prove that a trefoil is not equivalent to the figure-eight knot (the prime knot with 4 crossings)? Look closely at the crossings of the knots.


Unknot
3_1
4_1
5_1
5_2
6_1
6_2
6_3
7_1
7_2
7_3
7_4
7_5
7_6
7_7