

# Math Circles - Mathematical Knots

What is a knot?

1. Find a partner, and share a piece of rope. Tie a knot and pass it to your partner. Can your partner untie it?

Take turns trying to tie a knot your partner cannot untie.

2. Once you tie a knot, how can you ensure that your partner will never untie it, no matter how hard they try?

3. Now, tie another knot, but this time close the ends of the rope using tape. Ask the other person to untie the knot.

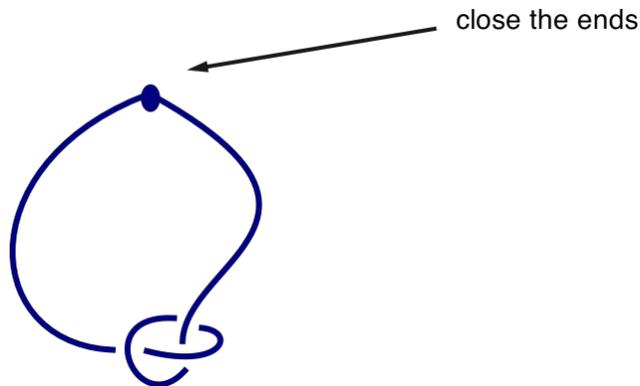
**Rule: do not break the rope nor the tape.**

The knot in problem 1 is the type of knot we see every day, for example

your shoelace knot. You can always untie this kind of knot.



The second knot is a **mathematical knot**. It is a closed loop, so you cannot untie it without cutting the rope.

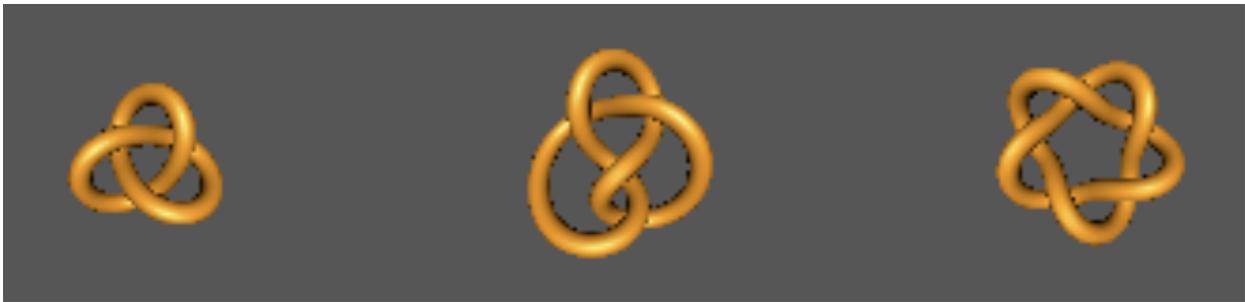


What is the simplest mathematical knot?

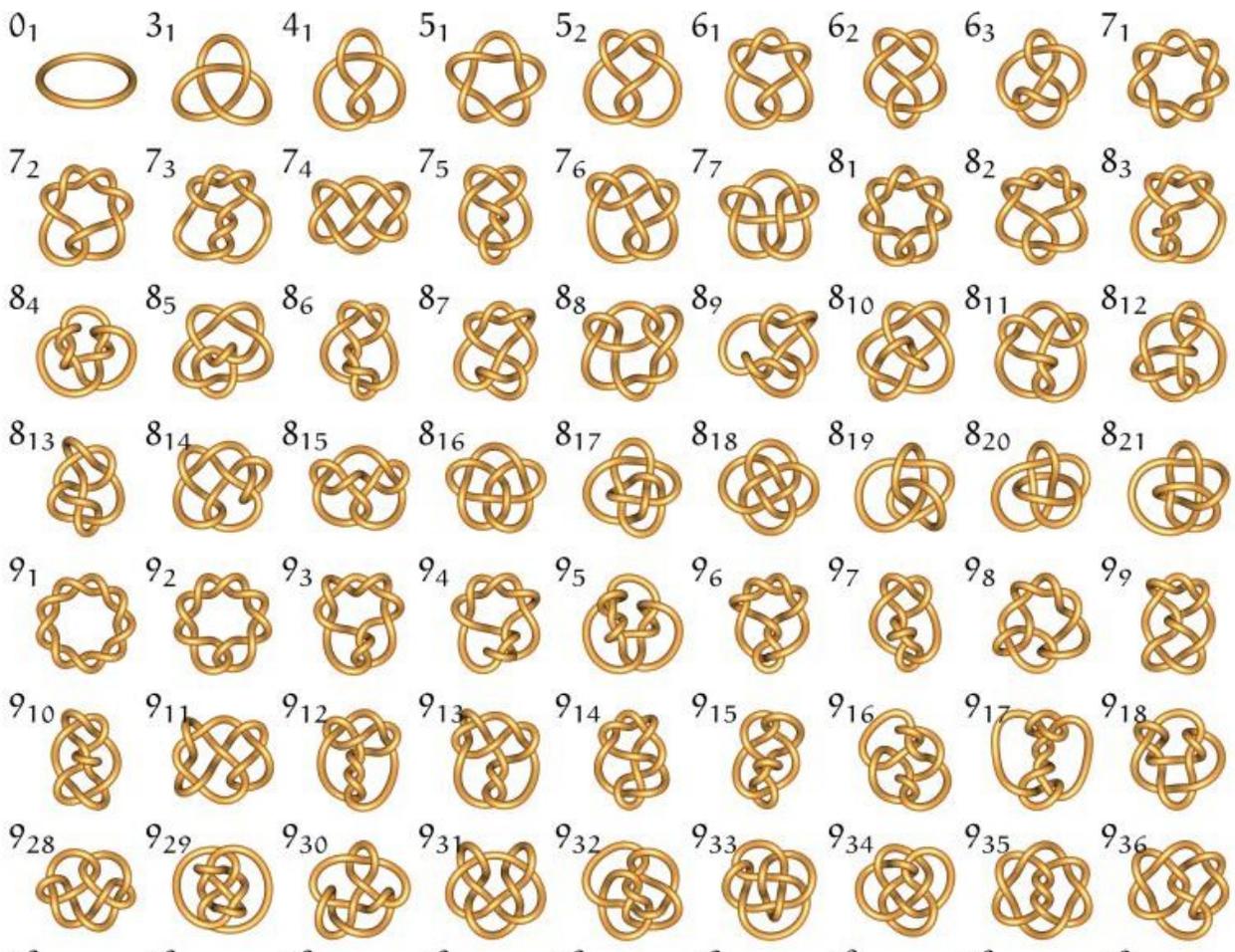
4. Can you make a knot with 1 crossing?  
2 crossings? What is the smallest  
number of crossings that you need to  
make a knot? Sketch it. How would you  
call it?

5. Homework:

- a. How would you call the following three knots (in English)
- b. Redraw them underneath the picture



The knot zoo ([knotplot.com](http://knotplot.com))



## 6. Computer Activity

Edit knots ([knotplot.com](http://knotplot.com))