



Knots

Skill and Experience ● ○ ○ ○ ○ ○

How it relates to maths

.....

In mathematics a knot is a closed loop with some sort of tangle in it which cannot be untangled without cutting the loop. There is a whole branch of mathematics called “knot theory” and ways to describe knots and identify when knots are the same or different. It gets quite complicated using polynomials, matrices and continued fractions. The theory has practical applications in chemistry, biology and engineering.

The trefoil is a chiral knot, which means its mirror image is a different knot; it can be right-handed or left-handed. Imagine water flowing through the knot and look at a crossing point. Compare this to your thumb laid on top of your first finger at right angles. If your thumb points upwards on top, your first finger points left with your right hand but points right with your left hand.



On the left is a left-handed trefoil, and on the right is a right-handed trefoil. Once you have made a trefoil it is either right-handed or left-handed. You can't change it except by cutting it apart!

However, the 4^1 knot with four crossings is amphichiral. That means that it is neither left-handed nor right-handed and you can make it look like its mirror image by jiggling it about a bit. How? Well, make one and find out!

A loop which just looks like a circle is sometimes known as an “unknot”, like this:



A knot with three crossings is a trefoil or 3^1 which looks like this:



A knot with four crossings is a 4^1 , like this:



There is more than one way to make a knot with five crossings. The 5^1 looks like this:



What you'll need



Some odd balls of 4 ply yarn



A 3.5 mm crochet hook



A picture of the knot you want to make



Scissors



A tapestry, darning or wool needle

Step-by-Step Instructions

- 1 Make a slip knot and make a chain which is about 30cm long.



- 2 Tie your chain into the knot you want, trying not to twist the chain too much.
The right-handed trefoil knot looks like this.



- 3 Join up the loop by working into your first chain stitch and work double crochet (UK double = US single) into the chain all the way round.



- 4 When you come back to where you started, make sure you work the second row into the first row and not into the initial chain.



- 5 When you have worked six rows, cut a tail of about 60cm and pull this through the last loop to make the work secure.



- 6 Roll the crocheted tape up into a cylinder and sew it up around the loop. It has a natural roll and the starting slip knot should tuck in beside the last stitch.

Quick Tips



I used 4 ply and a 3.5mm hook, but you could use any yarn. You might want a longer initial chain with thicker yarn. Experiment and see what happens!

The instructions here are for a trefoil knot with three crossings. A knot with more crossings will need a longer initial chain and a longer tail of yarn to sew it up. Too long is better than too short.

It is just about impossible to keep all twist out of the initial chain as you tie it into a knot but try to keep it to a minimum.

If you work the second row into the original chain rather than into the first row, the band becomes a Möbius strip and is impossible to roll over and sew into the seamless loop of rope we want.

When you are making a knot it can look like a tangled mess. Have confidence though! As you are sewing it up, you'll notice how it turns into something recognisable. It doesn't take much yarn, so if it goes wrong, just try again!