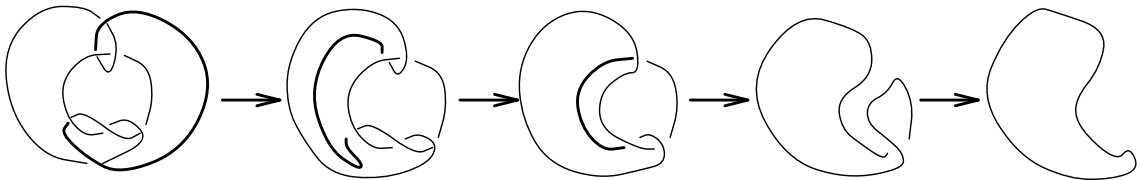
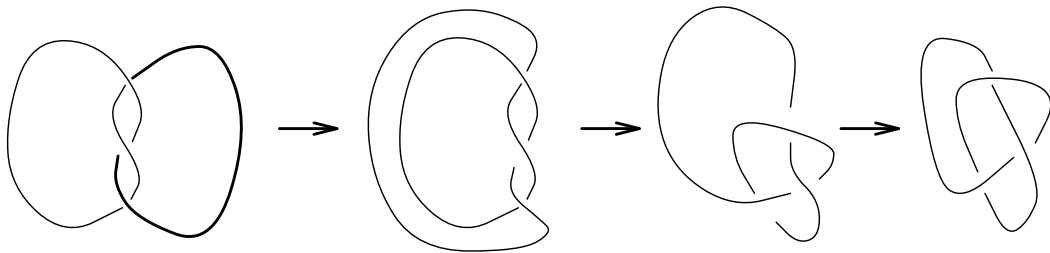


*Note* Most of the examples on this sheet can be solved by making models of the knots and playing with them until you reach the required form. Mathematics enters when you try to explain your solution to someone else, or to write it down so that you can recover it yourself later. For this it seems best to work with a sequence of diagrams and a set of allowable moves which convert each diagram to the next in the sequence. Exactly which moves are allowable is a matter of choice and convenience. Later (Chapter 2) we shall study the three *Reidemeister moves*, which are theoretically sufficient for all knot and link equivalences. However, in practice most people find it a bit artificial to restrict themselves only to Reidemeister moves. Hence I have designed the solutions presented below to suit my own personal tastes. You are strongly encouraged to work out alternatives, and to make your own sequences of diagrams.

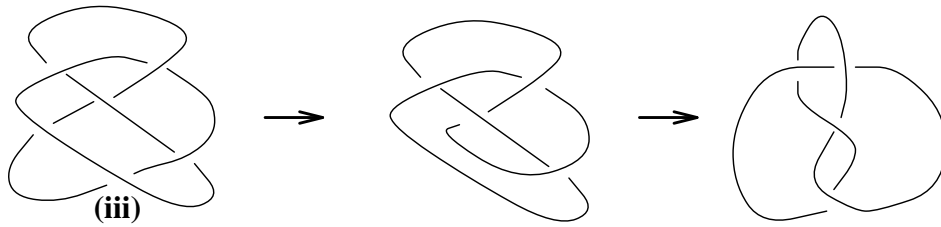
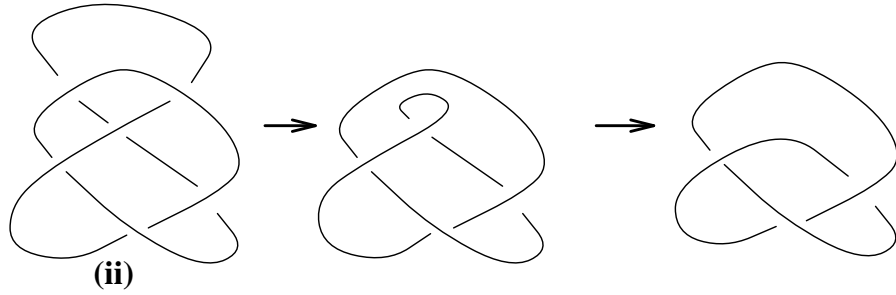
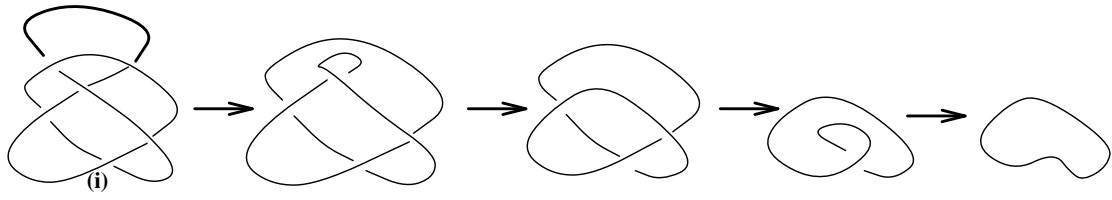
1. The following diagram shows a sequence of moves that will undo this knot. In each diagram the part of the knot that is moved is shown by a thicker line.



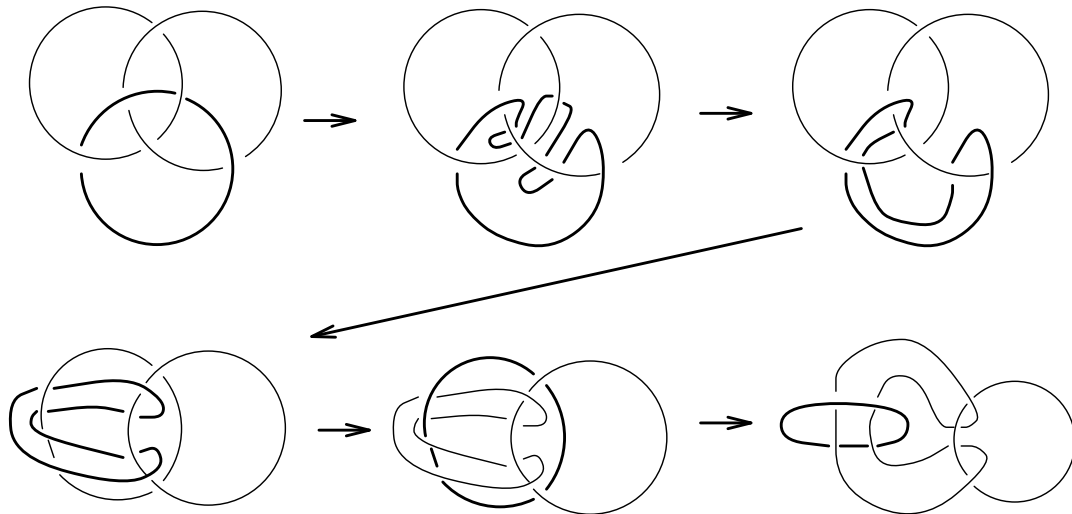
2. Here is a similar sequence of moves to convert to the standard diagram for a left hand trefoil knot.



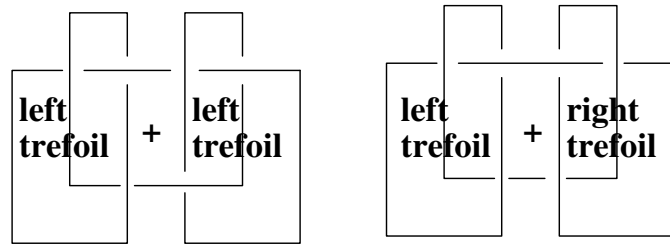
3. The following sequences of moves show that we have (i) the unknot (ii) the right hand trefoil knot and (iii) the figure 8 knot.



4. For this one, I worked with a model of the Borromean rings, in which I made one ring much bigger than the other two.

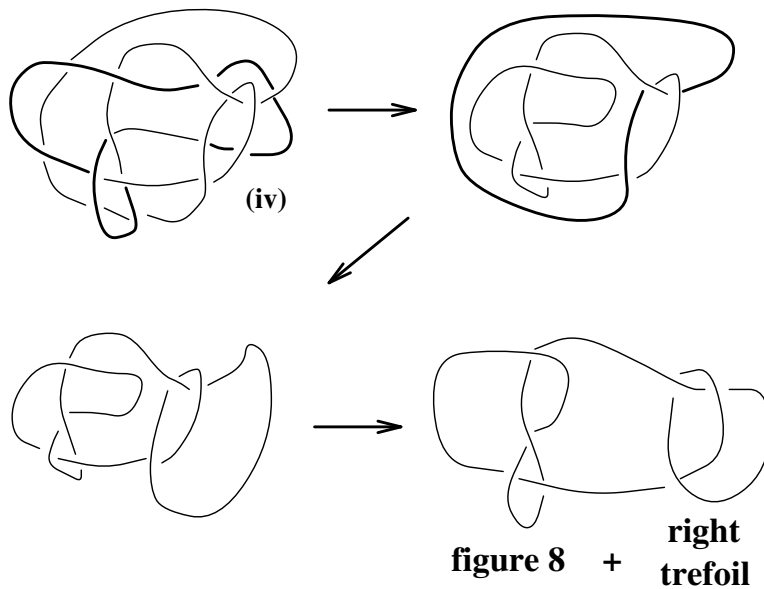
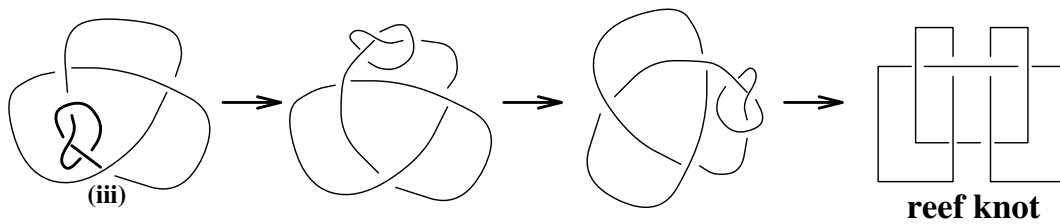


5. The first two are rather obviously composite, but are included to show the real difference that orientation makes when combining knots by the connected sum or composition operation. The difference in the physical properties of the reef knot (or square knot) and granny knot is something most of us learn from experience.



(i) granny knot

(ii) reef knot



6. Here the task is to find a crossing you can switch so that the resulting diagram is an unknot. Trial and error is recommended, particularly as there is usually a good choice of suitable crossings.

