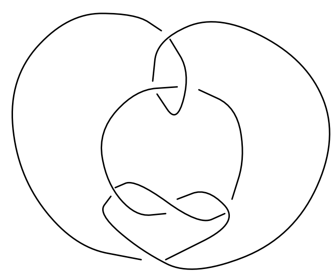
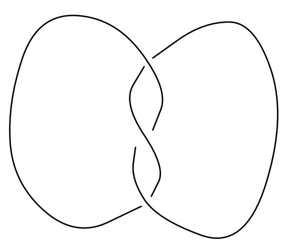
Note The purpose of these examples is to develop your skills in handling knot diagrams. You may also wish to experiment with physical models, especially if you feel baffled about how to begin. However, you should attempt to record your work diagrammatically as soon as possible. Remember that until we have developed some knot invariants, we do not have proofs that even the simplest knots are not unknots. Hence these examples necessarily concentrate on the other side of the story, the task of showing that two diagrams that are claimed to be equivalent really are so. There isn't really any systematic way to go about this, unfortunately. However, the hand and eye skills developed in working with these diagrams will be valuable later when we reach the more algorithmic tasks in the course, which are concerned with the calculation of invariants.

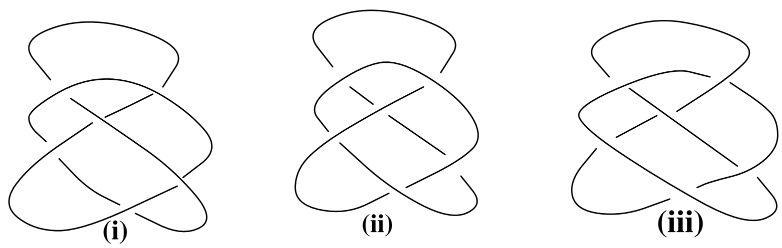
1. Show that the following knot is an unknot.



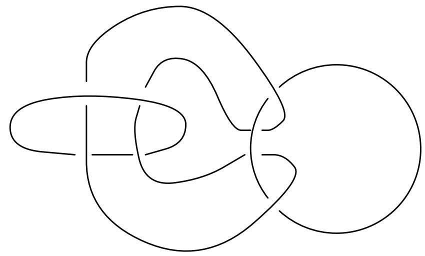
2. Show that the following diagram represents a trefoil knot.



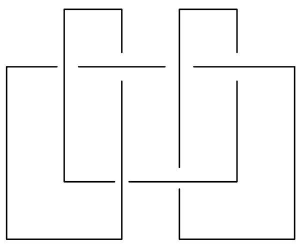
3. The diagrams below shows non-standard diagrams of standard knots. Identify these knots from your knot table.



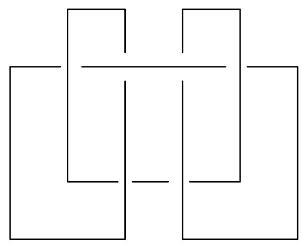
4. Show that the following diagram represents the Borromean rings.



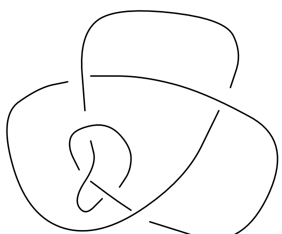
5. Show that the following diagrams represent composite knots, and express these knots as sums of prime knots.



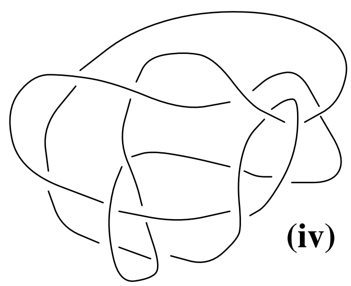
(i) granny knot



(ii) reef knot

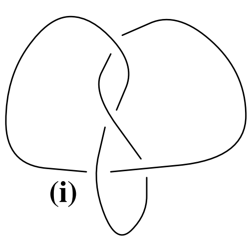


(iii)

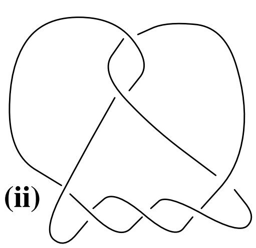


(iv)

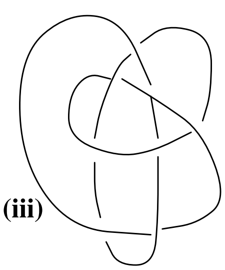
6. Assuming that the following knots are not unknots, show that they have unknotting number 1.



(i)



(ii)



(iii)