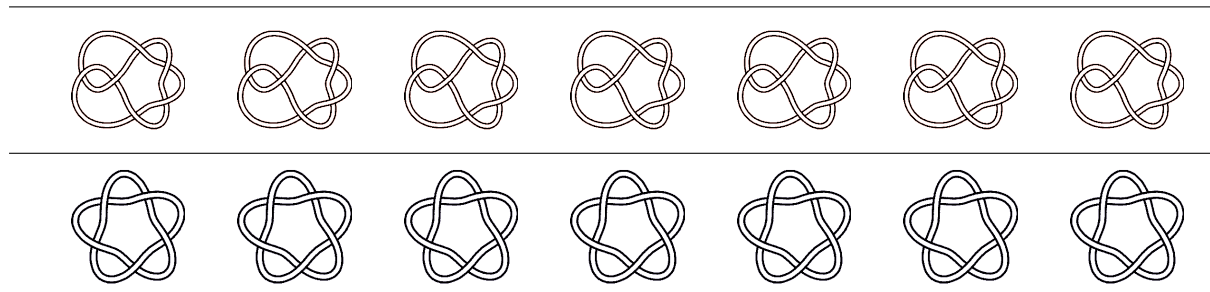
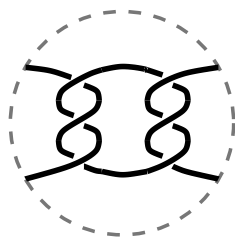


Knot colorings

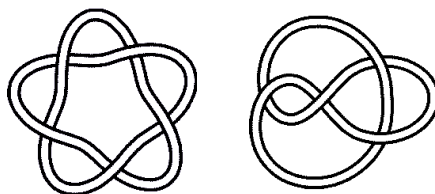
Exercise 1: Distinguish the following two knots with themselves and with the unknot.



Exercise 2: Suppose a knot diagram D contains a portion like the one shown below. Show that the knot represented by D cannot be the unknot. **Bonus:** Show that it could be a trefoil.

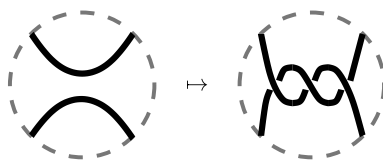


Exercise 3: Show that the following knots cannot be distinguished by p -coloring invariants.



Definition: Let $\text{col}_3(K)$ be the number of 3-colorings of knot K .

Exercise 4: Show that if a link L is changed into a new link L_0 by the local insertion of three half-twists as shown, then $\text{col}_3(L) = \text{col}_3(L_0)$.



Exercise 5*: Show that $\text{col}_3(K_1 \# K_2) = \frac{1}{3} \text{col}_3(K_1) \text{col}_3(K_2)$