Knot theory exercise sheet - week VIII

(1) Estimate the genera of the following knots. Notice that the first two knots are the boundaries of the ribbons drawn below.



- (2) Determine the genus of the knots 4_1 , 6_1 , 8_1 , $2n_1$.
- (3) Estimate the genus of any three knots with nine crossings.
- (4) Determine which sentences are **true** or **false** (prove the true ones and find a counterexample to each false one).
 - (a) There exists a knot K with the Alexander polynomial $\Delta_K(t) = t^4 6t^3 + 11t^2 6t + 1.$
 - (b) Any knot with genus equal to one is prime.
 - (c) There exist a prime knot with genus greater than one.
 - (d) There exists infinitely many prime knots.
 - (e) There exists an oriented surface of genus 5 bounded by the trefoil.
 - (f) There exists a knot with arbitrarily large genus.