Exercise sheet 5

Knots and Braids, MTH436

1. Use the free differential calculus to compute the Alexander polynomials of the trefoil and figure-8 knots.
2. Prove that the genus of a knot is bounded below by half the breadth of the Alexander polynomial.
3. Consider the map $f : B_n \to B_n$ defined by $f(e_i) = e_i^{-1}$. Prove that f is a homomorphism.
4. Prove that B_n can be generated by just two elements, e_1 and $e_1 e_2 \dots e_{n-1}$.
5. Prove that the natural inclusion $i : B_n \to B_{n+1}$ is injective.