Math Studies Algebra: homework #8*
Due 25 October 2017, at start of class

Collaboration and use of external sources are permitted, but must be fully acknowledged and cited. For your own learning, you are advised to work individually. Collaboration may involve only discussion; all the writing must be done individually.

Homework must be submitted in LaTeX via e-mail under the same rules as the previous homeworks.

1. Prove that in the group $G = \langle r, s \mid r^n = s^2 = srsr = 1 \rangle$ the elements r^i, sr^i for $i = 0, 1, \ldots, n-1$ are distinct. (Note that in our sketch of $G \cong D_{2n}$ in class, we did not prove this. It is your job now.)

2. A proper subring M of R is *maximal* if there is no proper subring R' of R such that M is a proper subring of R'. Does every ring with at least two elements contains a maximal subring?

3. (Bonus problem) Enjoy your break.

*This homework is from `http://www.borisbukh.org/MathStudiesAlgebra1718/hw8.pdf`.