This homework is due at 9pm on Friday, January 18. If you have not received an e-mail invitation to sign up for Gradescope, please e-mail your instructor. When you submit your homework, please make sure that your writing and scan are clear and legible.

Write complete solutions or proofs to the following problems. Numbered chapters and problems refer to Eccles’ book. Before you attempt a problem, make sure you have read your lecture notes and the corresponding parts of the chapter in the textbook.

**Chapter 1 Exercises:** 1.2(i), 1.2(ii)
**Chapter 2 Exercises:** 2.1, 2.4(i), 2.5(i)
**Chapter 3 Exercises:** 3.2, 3.3, 3.6
**Chapter 4 Exercises:** 4.2, 4.3

**Problems I:** 4, 11, 12

**Problem A (not from textbook):** Show by induction on $n$ that for all integers $n \geq 3$ we have $2^n > 2n + 1$.

If you feel like it, you can also think about the following problem, which will not be graded.

**Bonus problem (challenge):** Problem 20 from Problems I in Eccles.