

**MATH 231BR: ADVANCED ALGEBRAIC TOPOLOGY**  
**HOMEWORK 1**  
**DUE: TUESDAY, FEBRUARY 7 AT 12:00AM (MIDNIGHT) ON CANVAS**

In the below, I use LAT to refer to Miller's *Lectures on Algebraic Topology*, available at:  
<https://math.mit.edu/~hrm/papers/lectures-905-906.pdf>.

1. PROBLEM 1: LIMITS AS EQUALIZERS OF PRODUCTS (15 POINTS)

Do Exercise 39.15 of LAT.

2. PROBLEM 2: ADJOINT FUNCTORS VIA (CO)UNITS (10 POINTS)

Do Exercise 39.17 of LAT.

3. PROBLEM 3: UNIQUENESS OF ADJOINTS (10 POINTS)

Do Exercise 39.18 of LAT.

4. PROBLEM 4: PROPERTIES OF MAPPING OBJECTS (15 POINTS)

Do Exercise 40.10 of LAT.