

# MATH 340 Assignment 8, Fall 2017

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This final assignment is due Monday December 4th at 11:20 am.

Late penalty:  $-20\%$  for up to 24 hours late. Zero after that.

## Section 3.1: Basic Properties of Groups

Exercises 5, 7(iii), 8, 9, 12.

Let  $M$  be the set of all invertible 2 by 2 matrices over  $\mathbb{Z}_2$ .

- (a) List all matrices in  $M$ . You should get 6.
- (b) Prove that  $M$  is a group under multiplication.  
Use any facts from linear algebra that you need.
- (c) Determine the order of each matrix.
- (d) Why is  $M(\cdot)$  not isomorphic to  $\mathbb{Z}_6(+)$ ?  
Since the Dihedral group  $D_3$  is the only other group with 6 elements, conclude that  $M$  must be isomorphic to  $D_3$ .

## Section Ideals

Exercises 1, 2, 3 (a)+(b), 4, 5, 6.

See my notes on the course webpage.

## Section 2.14: Error Correcting Codes

Exercises 1, 4, 6.