

# Math 320 HW 8

March 25, 2024

**1)**

Let  $G = D_6$  and let  $H = \{e, r^3\}$  be a subgroup of  $G$ .

**a)**

Show  $H \trianglelefteq G$ . ( $H$  is a normal subgroup of  $G$ )

**b)**

Find  $G/H$ .

**2)**

Let  $G$  be an abelian group and let  $H \leq G$ . Show  $H \trianglelefteq G$ .

**3)**

Prove that any quotient group of a cyclic group is cyclic.

**4)**

Prove that any quotient group of an abelian group is abelian.

**5)**

What project option and topic are you choosing for your project? (This isn't set in stone and can change).