Math 3140: Homework 10

Due: Wednesday, November 28

1. For $G = D_3 \times \mathbb{Z}_2$,
   
   (a) Find all the normal subgroups $N \triangleleft G$,
   
   (b) Find all the conjugacy classes,
   
   (c) Find all the quotient groups $G/N$ (identify the groups up to isomorphism).

17.4 Let $G$ act on a set $X$, and let $O$ be an orbit in $G$. Show that $G_x = G_y$ for all $x, y \in O$ if and only if $G_x \triangleleft G$. 