MTH 203: Groups and Symmetry

Homework II

1. Establish the assertions in 1.1 (v) of the Lesson Plan.

2. Establish the assertions in 1.3 (ii) (c) & (d) of the Lesson Plan.

3. Let G be a group.

   (a) For $g \in G$, if $g^m = g^n = 1$, for $m, n \in \mathbb{Z}$, then show that $(g)^{\gcd(m,n)} = 1$.
   [Hint: Use the Euclid's algorithm.]

   (b) Use (a) to establish assertion 1.2 (vi) of the Lesson Plan.

4. Show that every nontrivial group G has a cyclic subgroup.

5. Is $D_{2m} < D_{2n}$, for every $m < n$? Explain why, or why not.