

# Some extra problems for Math 4107

January 30, 2008

Here are some problems for your homework, which I have been implicitly using in class, but which I should have perhaps gone through in detail in the lectures. For these problems, fix a group  $G$ , and suppose that  $A, B, C \leq G$ .

1. Show that for every  $x \in G$  and  $a \in A$ ,

$$xAa = xA.$$

2. Show that

$$xAA = xA.$$

3. Show that if

$$AB = A,$$

then

$$B \subseteq A.$$

4. Show that

$$AB = AC \implies B \subseteq AC, \text{ and } C \subseteq AB.$$

(As an exercise not to be turned in, show that one does not always have that  $B = C$  – i.e. you cannot always cancel the  $A$ .)