

## solutions

MA 362 Quiz 7 – Section 35 Takeaways – Friday, April 12

1. Give the Definition of:  $G$  is a *simple* group.

$G$  is simple if the only normal subgroups of  $G$  are  $\langle \text{id} \rangle$  and  $G$  itself.

For problems 2 and 3, recall that for a *composition series* for a group  $G$  is a subnormal series

$$\langle \text{id} \rangle = H_0 \trianglelefteq H_1 \trianglelefteq H_2 \trianglelefteq \dots \trianglelefteq H_n = G$$

where all the quotient groups  $H_{i+1}/H_i$  are simple.

2. Theorem State the Jordan-Hölder Theorem.

Any two composition series for a group  $G$  are isomorphic.

3. Give the definition of:  $G$  is a *solvable* group.

$G$  has a composition series

$$\langle \text{id} \rangle = H_0 \trianglelefteq H_1 \trianglelefteq H_2 \trianglelefteq \dots \trianglelefteq H_n = G$$

and for all  $i = 1, 2, \dots, n$ , the quotient

~~$H_i/H_{i-1}$~~   $H_i/H_{i-1}$  is abelian.