

Galois Theory Assignment 3

Work is to be submitted on Gradescope by 12:00 on Thursday 23 March. This is a hard deadline.

Please report any mistakes on this sheet to Tom.Leinster@ed.ac.uk.

Take care over communication and presentation. Your answers should be coherent, logical arguments written in full sentences. Marks will be awarded for this.

1. Let $M : L : K$ be field extensions, with $M : K$ finite and normal.

Prove that there is a smallest subfield L' of M such that $L \subseteq L'$ and $L' : K$ is normal. Here 'smallest' means that $L' \subseteq L''$ for any other subfield L'' with the same properties.