Galois Theory Assignment 2
Polynomials and field extensions

Work is to be submitted physically, on paper, by 12:10 on Monday 7 March. This deadline is on the assumption that all of the currently planned strike action goes ahead. If all or some of it is called off, the deadline may be sooner. In that case, I will let you know on Learn and by email. It will not be sooner than 12:10 on Monday 14 February.

If you are unable to attend the lecture on the day of the deadline, you can put your work under my office door (JCMB 5317). Please do not email it.

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. Prove that $\cos(\pi/9)$ is algebraic over $\mathbb{Q}$, and find its minimal polynomial. (Hint: begin by finding a general formula for $\cos 3\theta$.)

2. Find an irreducible polynomial $f \in \mathbb{R}[t]$ such that $\mathbb{R}[t]/\langle f \rangle \cong \mathbb{C}$ (and prove it!).