

Mathematics 204A Homework 2

Due: Monday 16 October 2023

1. Prove the theorem stated as Gauss Composition in the bonus lecture. In particular,
 - (a) prove that association from $Cl(R_D)$ to the integral binary quadratic forms lands in the binary quadratic forms of discriminant D ;
 - (b) prove that this association is surjective;
 - (c) prove that this association is injective.

See the problems in section 4 of the Gauss composition worksheet. Note that, if $f(x, y) = Ax^2 + Bxy + Cy^2$, the discriminant of f is the quantity $B^2 - 4AC$.

2. Do Problem 3.0.3 of the Gauss composition worksheet.
3. Do Problem 3.0.4 of the Gauss composition worksheet.