Math 203B (Algebraic Geometry), UCSD, winter 2020
Problem Set 6 (due Wednesday, February 26)

Solve the following problems, and turn in the solutions to at least four of them.

1. Let $k$ be a field. Let $\mathcal{L}$ be an invertible sheaf on $\mathbb{P}^n_k$ which is generated by global sections. Prove that $\mathcal{L} \cong \mathcal{O}(d)$ where $d$ is the degree of the hypersurface cut out by any nonzero section of $\mathcal{L}$. Then use this to finish the proof that the automorphism group of $\mathbb{P}^n_k$ is $\text{GL}(n + 1, k)/k^\times$.

2. Hartshorne exercise II.5.12 (both parts).


6. Hartshorne exercise II.7.6(a).