

**MATH 8254: ALGEBRAIC GEOMETRY II**  
**HOMEWORK 4**  
**DUE MONDAY, MARCH 27, 11:59 P.M.**

INSTRUCTOR: SASHA VORONOV

Review your course notes, study *Vakil's* Sections 4.5 (Proj and projective schemes), 16.2.1, 16.2.3 (generation by global sections), 16.2.7–16.2.8 (Serre's Theorem A), 19.1.3–19.1.4 (coherence of cohomology and Serre vanishing), 19.6 through 19.6.5 (Hilbert polynomials), 13.5 through 13.5.13, and 15.2 through 15.2.7 (line bundles and Weil divisors). Perhaps, reading my clarification text <http://www-users.cse.umn.edu/~voronov/8254s23/pdfs/rat1.pdf> before moving on to reading Section 15 of *Vakil* should help. Do **Exercises [Vakil]**: 4.5.T, 19.6.C, 19.6.E, 19.6.M, 15.2.F, 15.2.G.

Submit the homework by the end of the due day, 11:59 p.m. Please submit it electronically to Gradescope at <https://www.gradescope.com/courses/500650>, which you can access through Canvas.

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*Date:* March 12, 2023; Reading assignment changed March 26.