Beginning Exercises for the group on Radicals

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Here are some warmup exercises for the group on Radicals – the goal is partly learning about radicals, partly getting used to using M2. If you're a beginner, get help from the experts (among them Justin and Ayah!) More experienced M2 users might want to start right away to make some benchmarks for testing radical and minimalPrimes strategies.

Exercise 1. *The coefficients of the characteristic polynomial of an $n \times n$ matrix M are in the radical of the ideal of entries of $minors(1, M^n)$. Try generic matrices of small size and make a conjecture about which powers of each are in this ideal. How about higher order minors of M^n or of M^k for other k?*

Exercise 2. *In the situation of Huneke's Example 2.2, what power of $I_n(A)$ is in (f, g). What is $(f, g) : I_n(A)$?*

Exercise 3. *Write a "while" loop to implement the algorithm in Huneke's section 4; Put in a counter that will declare failure when Kollár's bound is passed.*