

Math 535
Problem Set 2

due Thursday, February 8, 2024

You may discuss problems with other students, but please write up your solutions on your own. Please try to write neatly. It is helpful if you staple all the pages together, and write your name on the first page.

1. Let k be a field of characteristic p . Show that

$$k^p = \{ a^p \mid a \in k \}$$

is a subfield of k .

2. Let k be a field of characteristic p . We say that k is *perfect* if every field extension of k is separable. Show that if k is perfect, then $k^p = k$.

Problems from the textbook

All problems are from the 3rd edition of *Abstract Algebra* by Dummit and Foote.

1. From Section 13.5, 2, 5
2. From Section 14.1, 2, 3, 4, 5, 7, 9