

MATH 300.202
Assignment 6

Due: Wednesday, February 15

Note: *You do not need to hand in your solutions to the starred problems.*

I. Find the complete factorization of the following polynomials.

(a) $p(z) := z^5 - 3z^4 + z^3 + 5z^2$.

(b) $p(z) := z^5 + z^4 + z^3 + z^2 + z + 1$. [HINT: Consider $p(z)(z - 1)$.]

II. Find the partial fraction decomposition of the following rational functions.

(a) $r(z) := \frac{2z - 1}{(z + 2)(z^2 + 1)}$.

(b) $r(z) := \frac{z^2 + i}{z^2(z + 1)}$.

(c) $r(z) := \frac{z^3 + 1}{z^2 - 1}$.

[Hint: First divide the numerator by the denominator to get a polynomial + a rational function whose numerator degree is less than its denominator degree.]

III. Section 3.1: 4, 7, 9*, 10

IV. Let $p(z)$ and $q(z)$ be polynomials of degree n . Show that if p and q agree at $n + 1$ distinct points, then $p(z) = q(z)$ for all z .

V. Section 3.1: 12, 14*, 18

VI. Section 3.2: 7, 13, 14(c)*, 17(b,c), 19*

VII. Section 3.3: 3, 6