

MATH 307

Individual Homework 5

Instructions: Read textbook pages 31 to 34 before working on the homework problems. Show all steps to get full credits.

1. Let P^4 be the set of all real coefficient polynomials of degree less than or equal to 4, check whether each one of the following is a basis of P^4 and justify your answer using exchange theorem:
 - (a) $\{1, x, -x^2, x^3\}$.
 - (b) $\{1, 1 + x, 1 + x + x^2, x^2 + x^3, x^3 - x^4\}$.
 - (c) $\{-x^4, x^3, -x^2, x, -1\}$.
 - (d) $\{5, x^4, x^3 - x^2, x^2 - x, x + 10, x^2 - 5\}$.
2. Textbook page 40, Chapter 3 problem 6.
3. Textbook page 40, Chapter 3 problem 7.
4. What is the dimension of $\mathbb{C}^{3 \times 2}$ over \mathbb{C} ? Let e_{ij} a 3×2 matrix with ij -th entry equals to 1 and 0 elsewhere. Is $e_{11}, e_{12}, e_{21}, e_{22}, e_{31}, e_{32}, e_{32} - e_{11}$ a basis of $\mathbb{C}^{3 \times 2}$? Justify your answer.