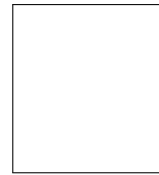




Bilkent University

Exam # 04  
Math 430 Introduction to Complex Geometry  
Due: 12 June 2020  
Instructor: Ali Sinan Sertöz



Name & Lastname: .....

Department: .....

Student ID: .....

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- Q-1)** Let  $M \subset \mathbb{P}^n$  be an irreducible,  $m$ -dimensional smooth submanifold. Assume that  $M$  is nondegenerate, i.e. it does not lie in any hyperplane of  $\mathbb{P}^n$ . Let the degree of  $M$  be  $d$ . We assume that  $n, d, m \geq 1$ , and of course  $n > m$ . Show that  $d + m \geq n + 1$ .
- Q-2)** A variety  $M$  in  $\mathbb{P}^n$  is called normal if the linear system of  $M$  giving the embedding  $M \hookrightarrow \mathbb{P}^n$  is complete. Prove that any hypersurface  $M$  in  $\mathbb{P}^n$  of degree  $d > 1$  is normal. (Here  $n > 1$ .)
- Q-3)** If you have to name only one theorem as the most important, or most exciting theorem among the ones we learned this semester in this course which one would you name? Explain why you prefer that particular theorem. No proofs are required for this answer. Just explain why that theorem seems most important or most exciting for you.
- Q-4)** Summarize in your own word what you learned from James D. Lewis's talk at the ODTÜ-Bilkent Algebraic Geometry Seminar on 29 May 2020.

Grading: 30+30+20+20 points.