

**MAT 401: Undergraduate Seminar**  
*Introduction to Enumerative Geometry*  
**Fall 2018**

**Homework Assignment I**

**Written Assignment due on Tuesday, 9/4, at 1pm in ESS 181**  
(or by 9/4, noon, in Math 3-111)

Chapter 1, #1,2,3,5,6

Please aim to make your solutions as concise and to the point as possible.

**Discussion Problems for 9/4**

What do  $\mathbb{C}P^1$ ,  $\mathbb{R}P^1$ , and  $\mathbb{R}P^2$  look like? (~10 mins)

Chapter 1, #8 and “duality” with the problem of determining the number of lines through 2 points in the plane. (~ 25 mins)

*Fundamental Theorem of Algebra and its Consequences:* Use Cauchy’s Integral Formula from complex analysis to show that every polynomial in one variable has a complex root and thus every degree  $d$  polynomial has exactly  $d$  roots counted with multiplicity. (~ 35 mins)

On Thursday, 8/30, please volunteer to discuss one of the above topics on Tuesday, 9/4.