

Homework 8

Due Friday, October 19 at the beginning of class

Reading.

Sections 7.1, 7.2, 7.3

Remark. Make grammatically correct sentences by adding in just a few English words.

Problems.

- (a) How many different full house poker hands are there? We consider the hands $\{K\heartsuit, K\diamondsuit, K\spadesuit, 2\clubsuit, 2\diamondsuit\}$ and $\{2\diamondsuit, K\spadesuit, 2\clubsuit, K\diamondsuit, K\heartsuit\}$ to be the same.

(b) What fraction of all possible poker hands are full houses?
- Use the Euclidean algorithm to find $\gcd(91, 161)$, and also to write $\gcd(91, 161)$ as a linear combination of 91 and 161 (i.e. write $\gcd(91, 161) = m \cdot 91 + n \cdot 161$ for some $m, n \in \mathbb{Z}$).
- Use the Euclidean algorithm to find the multiplicative inverse of 5 mod 17 (i.e. the integer y between 0 and 16 such that $5y \equiv 1 \pmod{17}$).
- Solve $5x \equiv 2 \pmod{17}$, where x is an integer between 0 and 16.