

Assignment #1 due Wednesday 9/13

at the beginning of class.

Write out your solutions on paper  
and give it to me at the beginning  
of class on 9/13.

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Assignment #1 problem 1

$$S = \{1, \dots, 30\}$$

(a) How many 3-element subsets of  $S$  are there?

$$\binom{30}{3}$$

(b) How many 3-element subsets of  $S$  are there  
with no two consecutive elements?

$$\left( \begin{array}{l} \text{The number of} \\ \text{3-element subsets} \\ \text{of } S \text{ with no two} \\ \text{consecutive elements} \end{array} \right) = \left( \begin{array}{l} \text{The total number} \\ \text{of 3-element} \\ \text{subsets of } S \end{array} \right) - \left( \begin{array}{l} \text{The total number} \\ \text{of 3-element} \\ \text{subsets which do} \\ \text{contain consecutive} \\ \text{elements.} \end{array} \right)$$

Total  
number  
of 3-element  
subsets =  $\binom{30}{3}$

Subsets of consecutive elements

$$\{x, x+1, x+2\} \quad 28 \text{ choices for } x$$

$$\{1, 2, x\} \quad \text{with } x \neq 3. \quad 27 \text{ choices for } x.$$

$$\{2, 3, x\} \quad \text{with } x \neq 1 \text{ or } 4. \quad 26 \text{ choices for } x.$$

$$\{3, 4, x\} \quad \text{with } x \neq 2 \text{ or } 5. \quad 26 \text{ choices for } x.$$

⋮

# Full house with Jokers

no jokers

$$\binom{13}{2} \binom{2}{1} \binom{4}{3} \binom{4}{2}$$

or one joker

$$\binom{2}{1}$$

↑  
pick  
the  
joker

or two jokers

impossible

Joker, Joker, A, 2, 7

is only 3  
of a kind

Joker, Joker, A, A, 7

is 4-of-a-kind

A full-house but no better  
using one joker  
looks like this

Joker, 3, 3, K, K

but not this Joker, 3, K, K, K