

HWS #11

$$S = \{1, \dots, 6\}$$

$$\{1, 2, 3, 4\} \rightarrow \{1, 2, 3, 5\} \quad \{1, 2, 3, 6\}$$

$$\{1, 2, 4, 5\}$$

$$\{3, 4, 5, 6\}$$

HWS #13

a) $\binom{2n}{2}$ b) $\binom{n}{2} + \binom{n}{2}$ ← # ways to pick 2 black socks.

↑ # ways to pick 2 white socks

c)
$$\frac{2\binom{n}{2}}{\binom{2n}{2}} = \frac{2 \frac{n \cdot (n-1)}{2}}{2n \frac{(2n-1)}{2}} = \frac{(n-1)}{(2n-1)}$$

$$\binom{n}{2} = \frac{n!}{2! (n-2)!} = \frac{n(n-1)}{2!} = \frac{n(n-1)}{2}$$

HWS #3

m varieties
n items

$$\binom{n+m-1}{m-1}$$

$n=12, m=75$

$$\binom{12+75-1}{75-1} = \binom{86}{74}$$

HW 8 #4d.

$$\text{Define } y = 35 - x_1 - x_2 - x_3 - x_4$$

$$35 \geq x_1 + x_2 + x_3 + x_4 \text{ iff } y \geq 0.$$

$$x_1 + x_2 + x_3 + x_4 + y = 35$$

$$\begin{array}{l} n=35 \\ n=5 \end{array} \quad \binom{35+5-1}{5-1}$$

HW 8 #15.

# digits	10
# lower	26
# upper	$\frac{26}{62}$

$$62^{10} - \left[\# \text{missing D or missing L or missing U} \right]$$

$$\left[\begin{array}{l} \# \text{missing D} + \# \text{missing L} + \# \text{missing U} \\ - \# \text{(missing D and L)} - \# \text{(missing D and U)} - \# \text{(missing L and U)} \end{array} \right]$$

$$62^{10} - \left(52^{10} + 36^{10} + 36^{10} - 26^{10} - 26^{10} - 10^{10} \right)$$

$$\begin{aligned} |A \cup B \cup C| &= |A| + |B| + |C| \\ &- |A \cap B| - |B \cap C| - |A \cap C| \\ &+ |A \cap B \cap C|. \end{aligned}$$