

Lesson 2:

Ex. p. 1.4: Let E be the set of the 65 members of the maintenance staff.

- $H \subseteq E$ be the people that bring hot dogs
- $C \subseteq E$ be the people that bring chicken
- $S \subseteq E$ be the people that bring salad
- $D \subseteq E$ be the people that bring dessert

a) We want to count $E \setminus (H \cup C \cup S \cup D)$.

So we want to count $|H \cup C \cup S \cup D|$.

By the inclusion-exclusion principle:

$$\begin{aligned} |H \cup C \cup S \cup D| &= |H| + |C| + |S| + |D| - |H \cap C| \\ &\quad - |H \cap S| - |H \cap D| - |C \cap S| - |C \cap D| \\ &\quad - |S \cap D| + |H \cap C \cap S| + |H \cap C \cap D| \\ &\quad + |H \cap S \cap D| + |C \cap S \cap D| - |H \cap C \cap S \cap D| \\ &= \dots = 62 \end{aligned}$$