

Sets: Venn Diagrams

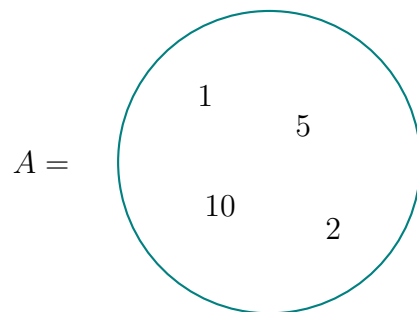
Video companion

1 Visualizing sets

- Venn diagrams
- Inclusion-exclusion formula
- Medical testing example, re-visited

2 Single set

$$A = \{1, 5, 10, 2\} \quad |A| = 4$$

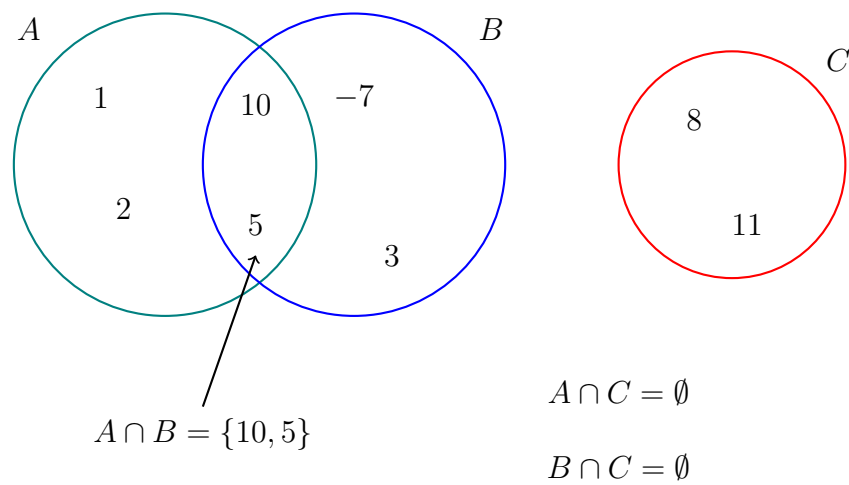


3 Multiple sets

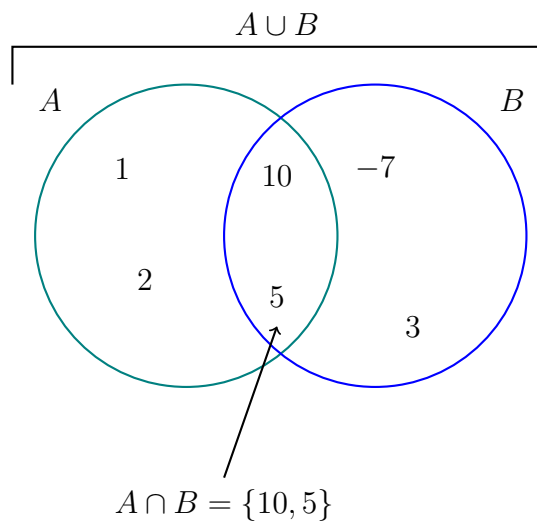
$$A = \{1, 5, 10, 2\}$$

$$B = \{5, -7, 10, 3\}$$

$$C = \{8, 11\}$$



4 Inclusion-exclusion formula



Inclusion-exclusion formula:

$$|A \cup B| = |A| + |B| - |A \cap B|$$

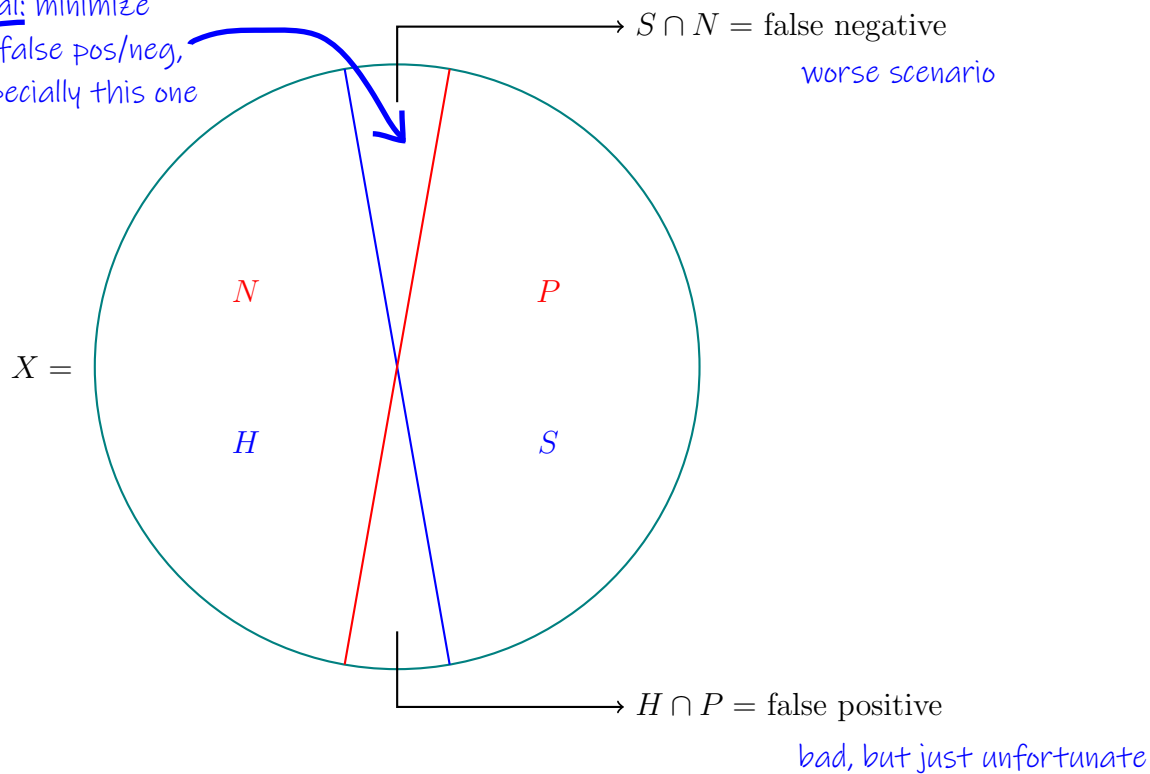
Check with this example:

$$6 \stackrel{?}{=} 4 + 4 - 2$$

$$6 = 6 \quad \checkmark$$

5 Medical testing example

Goal: minimize
 all false pos/neg,
 especially this one



$$\begin{aligned} X &= H \cup S & H \cap S &= \emptyset \\ S &= N \cup P & N \cap P &= \emptyset \end{aligned}$$