

The inclusion-exclusion theorem in statistics

- Draw a Venn diagram of a sample space. Draw two shapes in this diagram to represent two mutually exclusive events $X = x$ and $Y = y$.
- Draw a Venn diagram of a sample space. Draw two shapes in this diagram to represent two concurrent events $X = x$ and $Y = y$.
- Write out the inclusion-exclusion principle and use a Venn diagram to explain the origin of each of the terms in this expression.