

# The inclusion-exclusion theorem in statistics

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- 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.