

Venn Puzzler: math version

Complete as many Euler diagrams (on the Venn Puzzler pdf) as possible. For each Euler diagram:

1. Come up with 3 properties or definitions of sets so that the Euler diagram is correct.
2. Give an example (or several) of an element belonging to each non-empty region of your Euler diagram. (Don't forget the "outside" region!) You don't need to give an example if the region is supposed to be empty.

Notes:

1. Each property or definition must be mathematical and precise.
2. All elements must be natural numbers (i.e. $1, 2, 3, \dots$).
3. The more succinct and elegant your properties or definitions, the more points you earn.