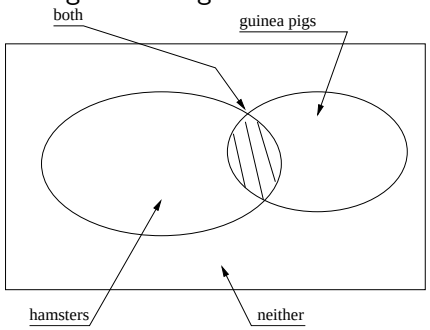
# AMS 102: QUIZ 3

SOLUTIONS

In the town of Rodentville, half of the households own a hamster, 30% of all households own a gunia pig, and 35% of all households own neither a hamster, nor a guinea pig.

(a) Determine the percentage of households that own both a hamster and a gunie pig.

$100 - 35 = 65\%$ of households own either a hamster or a guinea pig. Therefore, $65\% = 50\% + 30\% -$ (households that own both). Hence, 15% of households own both a hamster or a guinea pig. Alternatively you could use the following Venn diagram:




Hamsters and guinea pigs $= 65\%$. Guinea pigs only $= 65\%-$ hamsters$= 65\% - 50\% = 15\%$. Hamsters and guinea pigs $= 30\% - 15\% = 15\%$.

(b) If you choose a Rodentville household at random, what is the probability that it owns a guinea pig?

30% or 0.3.

(c) Are the events "own a hamster" and "own a guinea pig" independent?

$P$(hamster) $= 0.5$, $P$(guinea pig) $= 0.3$, $P$(hamster AND guinea pig) $= 0.15$. Since $P$(hamster)$P$(guinea pig) $= P$(hamster AND guinea pig), we conclude that the events are independent.

(d) The Johnsons own a guinea pig, while the Jacksons do not. Which household is more likely to own a hamster?

Neither. Since hamster ownership is independent of guinea pig ownership, knowing that a family owns/doesn't own one doesn't tell us anything about their chances to own the other.