Pigeon Hole Principle: If n>m pigeons are put into m pigeonholes, there's a hole with more than one pigeon.

Examples:

1. Prove that, given any 12 natural numbers, we can chose two of them and such that their difference is divisible by 11.

2. Suppose 51 points were placed, in an arbitrary way, into the square of side 1. Prove that some 3 of these points can be covered by a circle of radius 1/7.

3. If there are 6 people at a party, then either 3 of them knew each other before the party or 3 of them were complete strangers before the party. Hint: Label the 6 people as A, B, C, D, E, and F. Note that among the five people B, C, D, E, F, there must be at least three people that either knew A already, or that were strangers to A.

4. At any given time in New York there live at least two people with the same number of hairs on their body.