A **sample space** is a set of elements that represents all possible outcomes of a statistical experiment.

An **Experiment** is a repeatable procedure

A **sample point** is an element of a sample space.

An **event** is a subset of a sample space - one or more sample points.

Events are sets:

1. Can describe in words
2. Can describe in notation
3. Can describe with Venn diagrams

Probability and set operations on events:

Events: A, L, R

Rule 1. Complement: P(Aᶜ) = 1 – P(A)

Rule 2. Disjoint events: If L and R are disjoint then P(L U R) = P(L) + P(R)

Rule 3. Inclusion-exclusion principle: For any L and R: P(L U R) = P(L) + P(R) – P(L ∩ R)

Finite Sample Space, example: {a, b, c, d}

Infinite Sample Space, example {0, 1, 2, . . .}

Mutually exclusive

Equi-Probable

Collectively exhaustive

Kolmogorov’s three axioms of Probability:

If A&B are events in Sample Space, S, then

1. 0 <= P(A) <= 1
2. P(S) = 1
3. P(AUB) = P(A) + P(B) if (A∩B) = ф

Let’s say, in a bag 4 yellow balls and 6 red balls which are of same size and density are present.

1. 0 <= P(X = Yellow balls) <= 1

0 <= P(X = Red balls) <= 1

1. P(4Y+6R) = 1