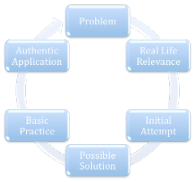
Putting it all together

Combinatorics | Probability | Expected Value



How are combinations and permutations connected with all of our learning in probability?

Permutations

Combinatorics | Probability | Expected Value

1. A random code generator has three letter digits (non-case sensitive, repetition allowed). What is the probability that when generating codes:
   a) You will get the same code twice in a row?
   b) You will get a code consisting of three identical letters, three times in a row?
   c) You will get a code with three different letters three times in a row?

Xor
U
∩

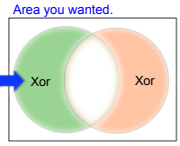
Solve with a Venn diagram AND formulas:
   d) You will either have a code with A's or B's
   e) Given you have a B in the first spot, what is the probability you will have A's and B's?

What just happened?!

Combinatorics | Probability | Expected Value

1. Solve with a Venn diagram AND formulas:
   d) You will either have a code with A's or B's

1 Area you wanted.



2 A formula you can use to find the probability of this area

$P(A \text{ Xor } B) = P(A) + P(B) - 2 \bullet P(A \cap B)$

3 How you found the area values

${}_nC_r$

${}_nP_r$

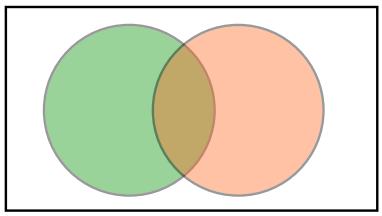
4 How you use the formula to calculate probability

$P(A \text{ Xor } B) = P(A) + P(\frac{1 + (3 \bullet 25) + (3 \bullet 25^2)}{26^3}) - 2 \bullet P(A \cap B)$

Combinations

Combinatorics | Probability | Expected Value

Your class has 30 students of which 10 are majoring in economics and 20 in sociology. A randomly formed study group of six students comes to you with a question.
a) What is the probability that this study group is comprised entirely of of either economics majors or sociology minors? Provide both a formulaic and Venn diagram solution.
b) What is the probability that (a) will happen then a second group comes comprised of students with both majors? (Assume the first group consisted of six economics majors).



Xor U ∩ Xor

Decision Making

Combinatorics | Probability | Expected Value

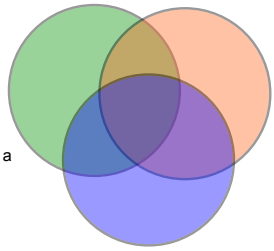
A casino game involves randomly drawing three balls all at once. They are drawn from a bin containing four red, seven green, five blue balls, and fourteen other coloured balls. The following ball groups (in any order) yield the payouts listed.

$100	Three red	$10	One red and a pair
$50	Any identical three	$5	One of each
$25	Two identical red	$1	One red

a) How much do you expect to win after playing this game one hundred times?

b) As the casino manager, decide the minimum price to charge a gambler to play this game.

Answer this question formulaically and with a Venn diagram.



A Summary of Probability