Using Combinatorics

to determine probability

Why?

- Probability is a ratio of the number of favorable outcomes (the ones you want) divided by the number of possibilities (how many ways can the task be done)
- Because we don't usually care how the outcomes are ordered, this can be done with combinations.

- It is easier to use combinatorics to find theoretical probability rather than listing and counting all the equally likely outcomes.

- What is the probability of being dealt exactly two sevens from a standard 52-card deck?
  - The number of combinations of 7's:
  - The number of combinations of non-7's:
  - The number of possible 5-card hands:
  - Probability:

- Sometimes you need to use combinations and probability together
  - ${}_nC_r * (P(A)^r) * (P(B))^{n-r}$
    - This helps you find the total probability

- You flip six coins. What is the probability...
  - that you get 6 heads?
  - that you get exactly 4 tails?
  - that you get at least 4 tails?

Geometrical Probability

- Is the probability of areas
- Area of the favorable location divided by the total area