Calculating probabilities: Takeaways ⮍

Syntax

- Finding probability of an event:

```
days_over_threshold = bikes[bikes["cnt"] > 4000].shpae[0] # number of days that
satisfies condition
total_days = bikes.shape[0] # total number of days
probability_over_4000 = days_over_threshold / total_days # proportion of condition
satisfied:total number of days
```

- Accessing the factorial method using the math module:

```
import math
math.factorial(5)
```

Concepts

- The probability of three heads when flipping three coins is `0.5 * 0.5 * 0.5`, which equals `0.125`.

- Probability follows a pattern. A given outcome happening all the time or none of the time, can only occur in one combination. The next step lower, a given outcome happening every time except once, or a given outcome only happening once, can happen in as many combinations as there are total events.

- A factorial means "multiply every number from 1 to this number together" so `4! = 4 * 3 * 2 * 1 = 24`.

- We can calculate the number of combinations in which an outcome can occur in a set of events using: ———— where;

    - `k` is the number of times we want the desired outcome to occur.

    - `N` is the total number of events we have.

- The probability of a single combination occurring is given by   where:
  - `p` is the probability of an outcome will occur.
  - `q` is the complimentary probability the outcome will not happen.
  - `k` is the number of times we want the desired outcome to occur.
  - `N` is the total number of events we have.

- Statistical significance is the question of whether a result happened as the result of something we changed, or whether a result is a matter of random chance. Typically, researchers will use `5%` as a significance threshold to determine if an event is statistically significant or not.

Resources

- [Binomial Distribution](#)
- [Factorial](#)
- [Statistical Significance](#)