Measures of Spread

Range

- Range is the difference between maximum and minimum.

$$\text{Range} = \text{max} - \text{min}$$

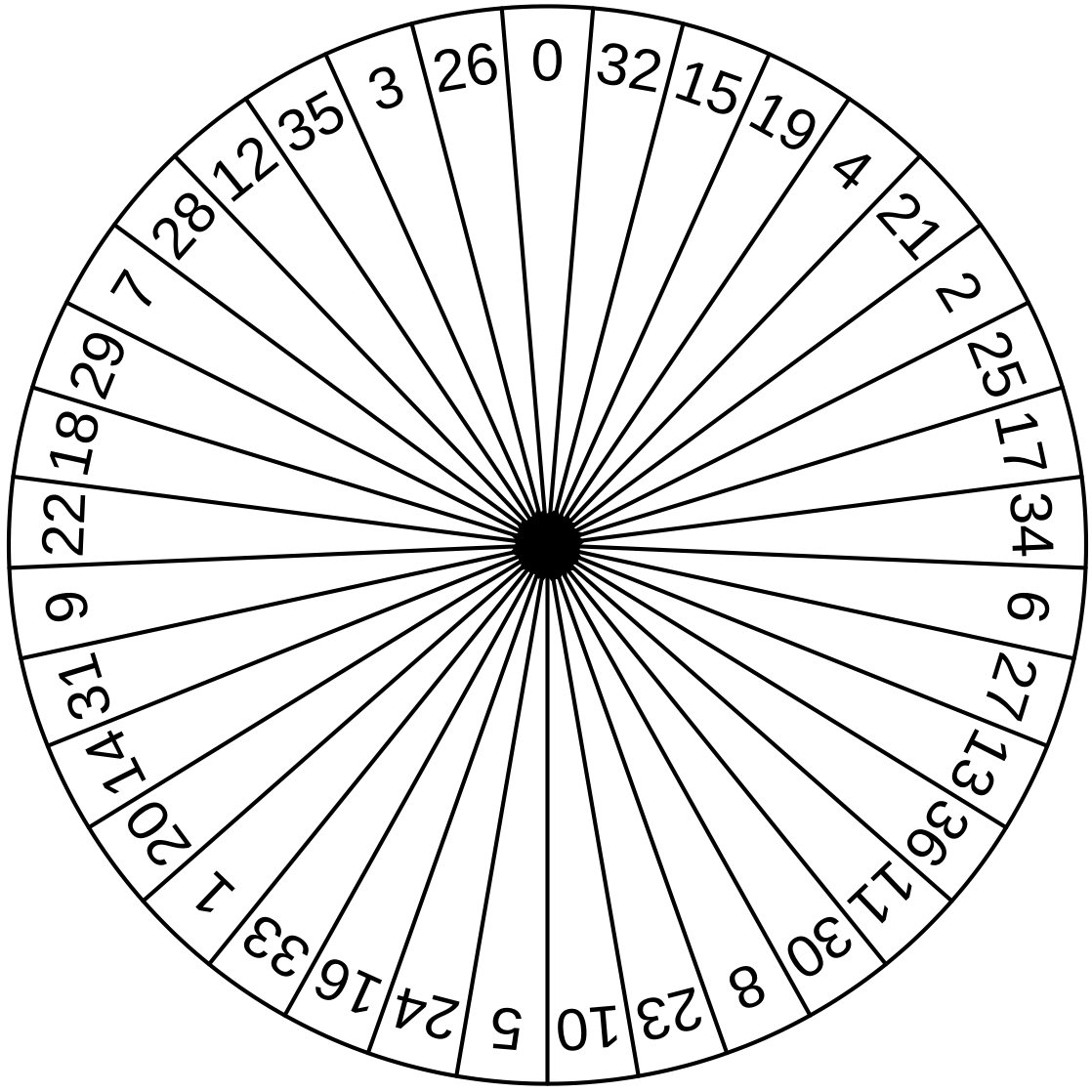
- Example:

$$\text{sample} = 8,5,20,6,5,4,19$$

$$\text{range} = 20 - 4 = 16$$

Roulette wheel

A (European) roulette wheel has 37 equally likely possible outcomes.

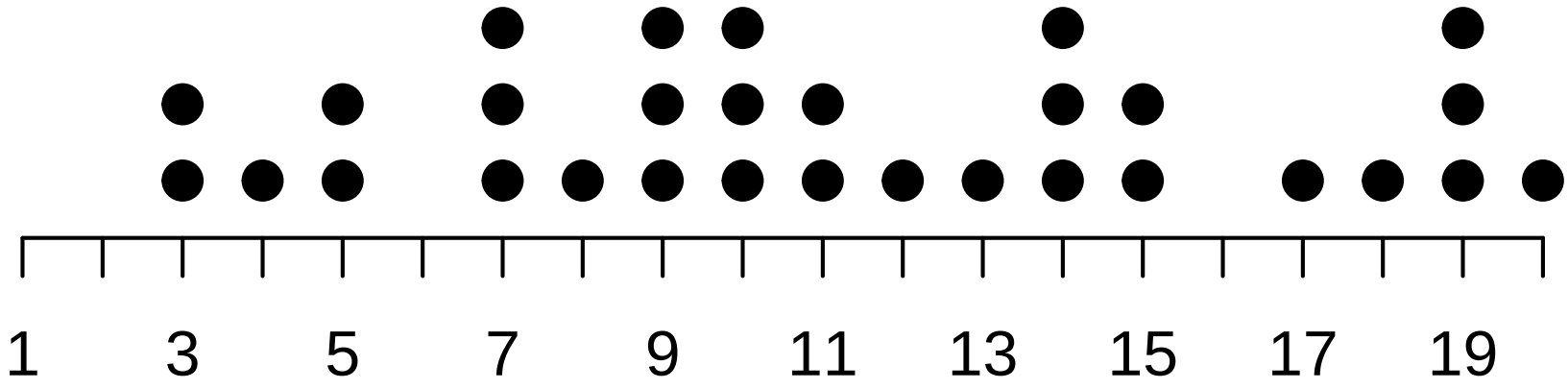


The problem with range...

- A sample's range will usually underestimate the population's range.
- A sample's range will usually underestimate a spinner's range.
- When we use a sample statistic (like sample's range) to estimate a population parameter (like population's range), we call that sample statistic an "estimator".
- We say range is a biased estimator.

Example

- Take a 20-sided die. It should be equally likely to land on any integer between 1 and 20. (Discrete Uniform Distribution)
- We say the population has a range of 19, because 20-1=19.
- I rolled 30 20-sided dice:



- The sample range is 17.