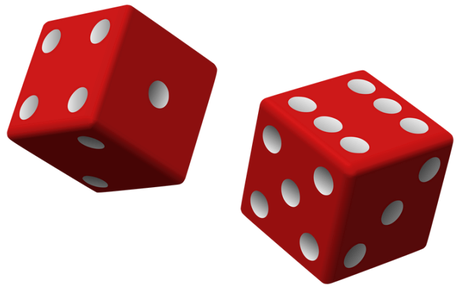


Advance Statistics and Probability

Measures of Central Tendency

Advance Statistics and Probability

Comparing Mean, Mode, and Median

1. Mean is the most frequently used measure of location since it reflects every value. Mean isn’t completely useful on very large and small values of data. The median is the most appropriate locator of central tendency.
2. There is always a unique value for mean and median, unlike mode which does not always exist in a set of values and the occurrence varies.
3. The mean is the most important and widely used, and the median can be determined by qualitative data as long as it can be ordered, while the mode used in getting typical average.

Uses of Mean, Mode, and Median

Mean

1. High statistical computations
2. Distribution where there are no extreme values
3. Distribution requires the greatest reliability.
4. Interval and ratio elements.

Mode

1. Quick and rough estimate
2. Easiest to determine, the most typical averages since it is the value that occurs the most.

Uses of Mean, Mode, and Median

Median

1. Determiniation of wether the cases fall within the lower halve or the upper halve of a distribution.

Limitations of Mean, Mode, and Median

Mean

1. The mean is easily affected by the weight of the values.
2. Clustering of values can also affect the mean.
3. It cannot be used as means of comparison between two or more distribution.

Median

1. It is affected by the number of observations in a given set.
2. It cannot be determined unless the given set of observation are arrayed.

Limitations of Mean, Mode, and Median

Mode

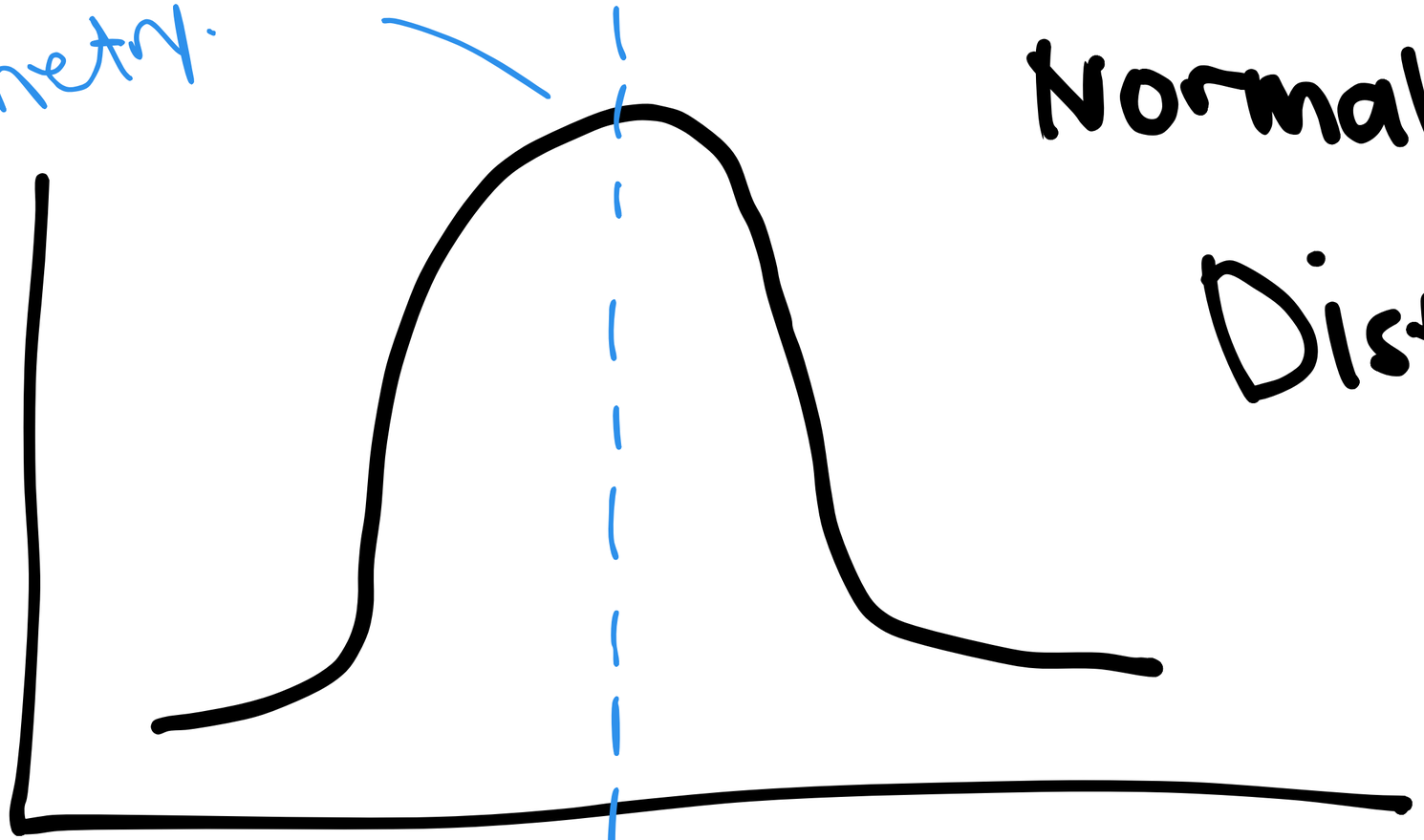
1. It does not always exist.
2. Its value isn't unique.

Skewness

In a symmetrical distribution (normal curve) where there is only one mode, mean, median and mode have equal values, and coincide at the highest point of the graph.

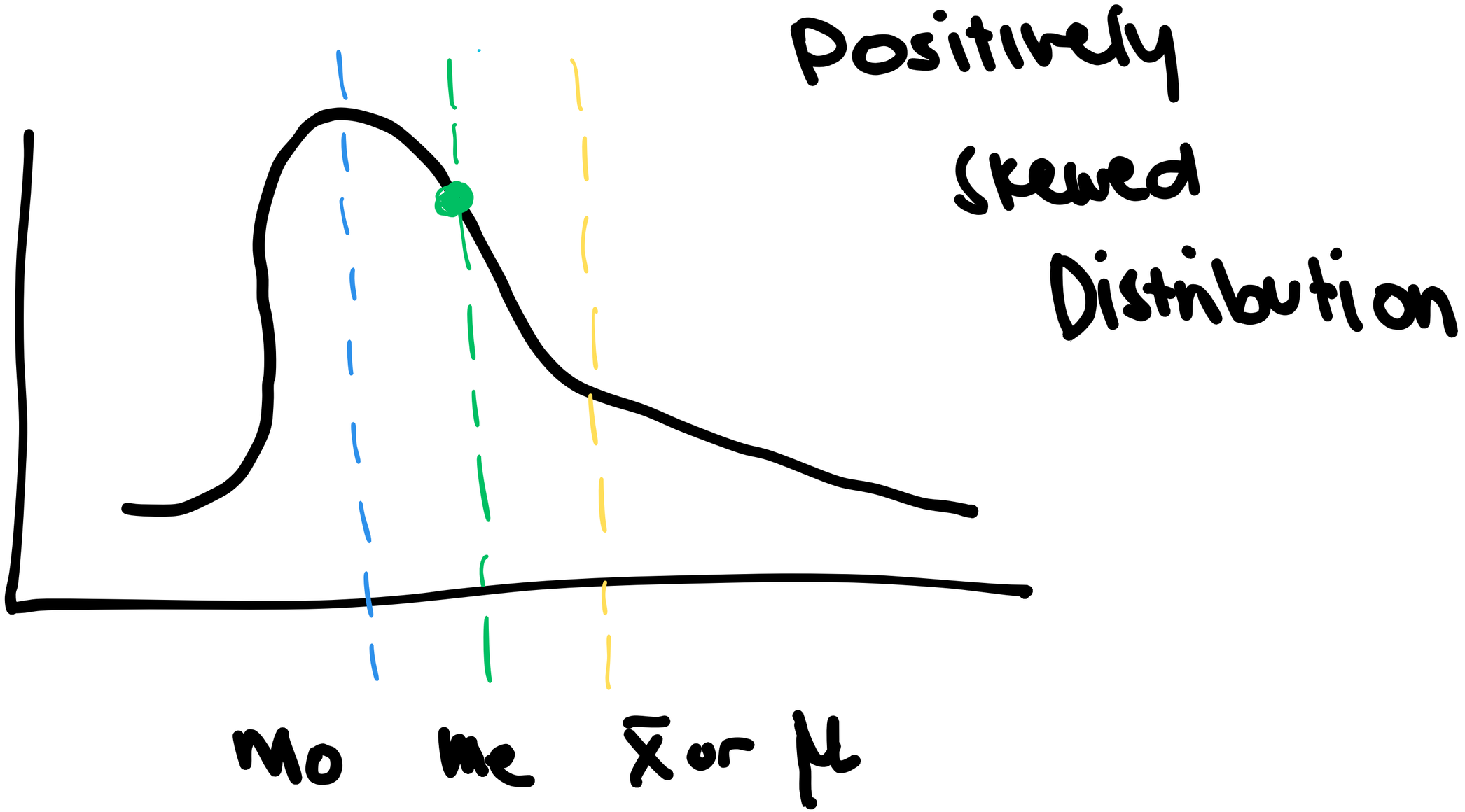
Postively skewed distribution(skewed to right) which implies that the distribution has larger values. Negatively skewed distribution has values accumulate to the left.

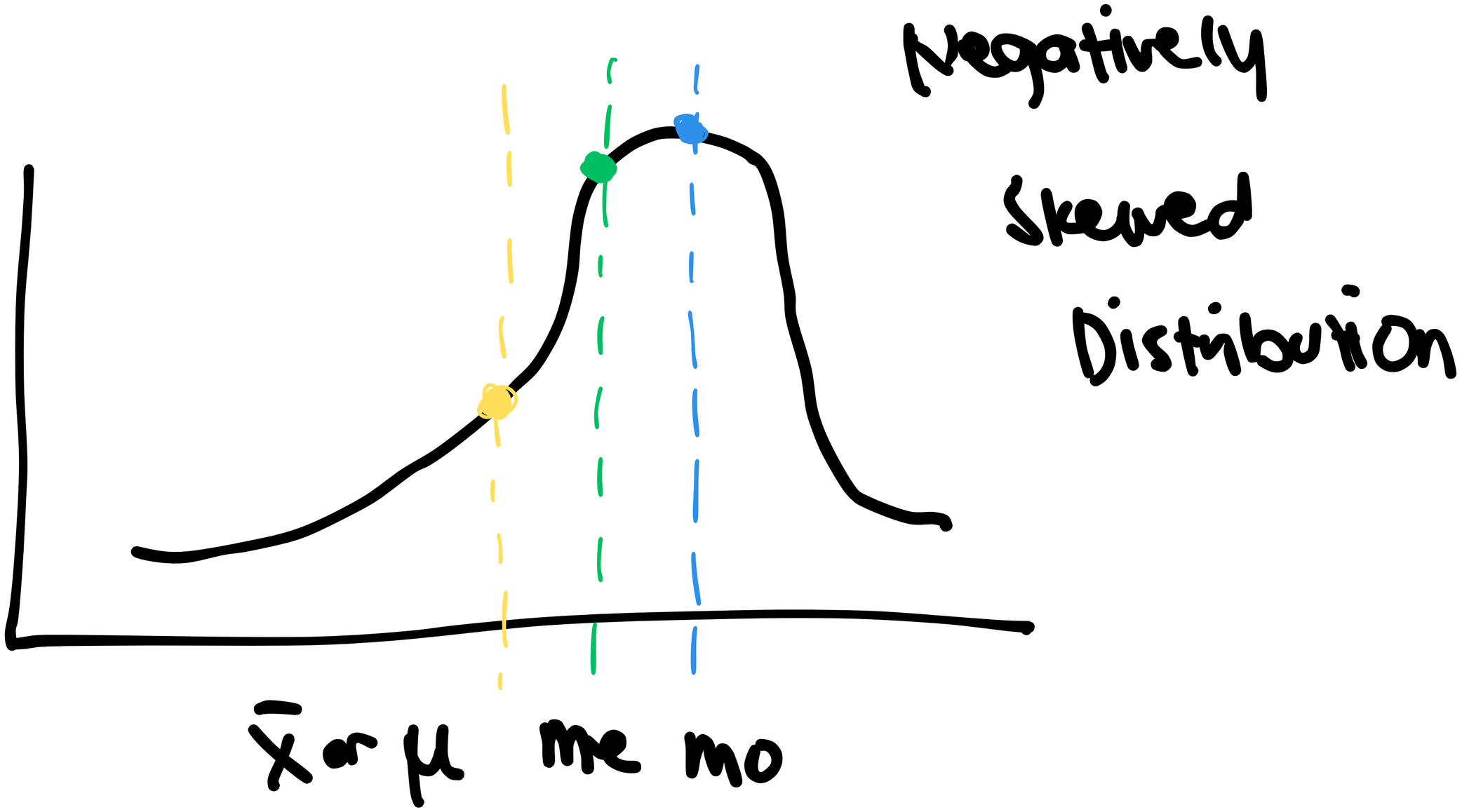
axis of symmetry.



Normal Distribution

μ or $\bar{x}$ = Me = Mo


Positively
Skewed
Distribution
Mo
Me
$\bar{x}$ or μ


Negatively
Skewed
Distribution
$\bar{x}$ or μ
me
mo

Quantiles and Fractiles

- **Quartiles -** are values that divide the distribution into four equal parts. Q1, Q2, and Q3.
- **Deciles -** are values that divide the distribution into 10 equal parts. D1, D2, D3, D4, D5, ..., D7, D8, D9.
- **Percentiles -** are values that divide the distribution into 100 equal parts. P1, P2, P3, ..., P97, P98, P99.

1. array the given data

2. compute the positions

Quartile:

$$\frac{n \times Q}{4}$$

Deciles:

$$\frac{D \times (n+1)}{10}$$

Percentile

$$\frac{P \times (n+1)}{100}$$

3. Locate the item base on the position.

4. interpolate if neccessary..

Find the 20^{th} percentile (P_{20})

45, 40, 42, 37, 36, 26, 28, 25, 32.

↳ arrayed scores from lowest to highest.

25, 26, 28, 32, 36, 37, 40, 42, 45.

Formula: $\frac{P(n+1)}{100}$

$n = 9$

$P = 20$

$$P_{20} = \frac{20(9+1)}{100}$$

$$= \frac{20(10)}{100}$$

$$P_{20} = \frac{200}{100} \text{ or } 2$$

25, 26, 28, 32, 36, 37, 40, 42, 45

Find the 5th decile (D_5).

19, 25, 45, 65, 71, 38

19, 25, 38, 45, 65, 71

$$D_5 = \frac{5(6+1)}{10}$$

$$= \frac{5(7)}{10}$$

$$D_5 = \frac{35}{10} \text{ or } 3.5$$

we must interpolate if we come up with this value

Interpolation :

3.5

19, 25, 38, 45, 65, 71

1. 45 - 38 = 7

2. multiply the decimal part of D_5

$D_5 = 3.5$

$0.5 \times 7 = 3.5$

3. add 3.5 to the lowest score on the sides of D_5 or 3.5

$D_5 = 3.5 + 38$

$D_5 = 41.5$

Advance Statistics and Probability