Bab 1
Ukuran Penyebaran

Measure of variability (ukuran penyebaran)

- Variability → quantitative measure of the degree to which scores in a distribution are spread out

▪ If every X were very close to the Mean→ the mean would be a very good predictor.

▪If the distribution is very sharply peaked then the mean is a good measure of central tendency → mean would be right choice

▪How much do the scores "deviate" from the mean? Think of the mean as the **true score** or as your **best guess**.

1. Standar deviasi

score	mean	deviation*	squared deviation
8	9.67	- 1.67	2.79
25	9.67	+15.33	235.01
7	9.67	- 2.67	7.13
5	9.67	- 4.67	21.81
8	9.67	- 1.67	2.79
3	9.67	- 6.67	44.49
10	9.67	+ .33	.11
12	9.67	+ 2.33	5.43
9	9.67	- .67	.45
	sum of squared dev=		320.01

$$\sigma = \sqrt{\frac{\Sigma\ (x - \bar{x})^2}{n - 1}}$$

Standard Deviation = Square root(sum of squared deviations / (N-1)
= Square root(320.01/(9-1))
= Square root(40)
= 6.32

Interquartil

- Interquartil (IQR) dirumuskan :

  IQR = Q3-Q1

- Inner fences & Outer fences

$$IF = Q_1 - 1.5(IQR) \quad \& \quad Q_3 + 1.5(IQR)$$

$$OF = Q_1 - 3(IQR) \quad \& \quad Q_3 + 3(IQR)$$

Ex

Susun boxplot dari data berikut dan tentukan apakah terdapat outlier atau tidak ! Jika ada, tentukan data tersebut dan tentukan apakah outlier atau ekstrem outlier ?

340, 300, 520, 340, 320, 290, 260, 330

MEASURE OF SYMMETRY (ukuran kesimetrian)

1. SKEWNESS

The skewness of a random variable X with mean μ and variance σ^2 is defined as

$$S(X) = \frac{\mathrm{E}[(X-\mu)^3]}{\sigma^3}$$

- **Skewness is a measure of symmetry, or more precisely, the lack of symmetry.**
- **A distribution, or data set, is symmetric if it looks the same to the left and right of the center point.**

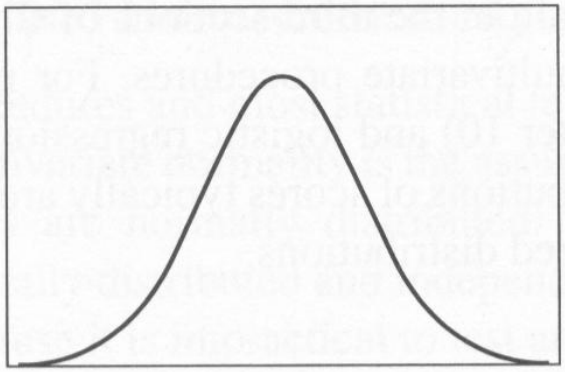
KURTOSIS

The kurtosis of a random variable X with mean μ and variance σ^2 is defined as

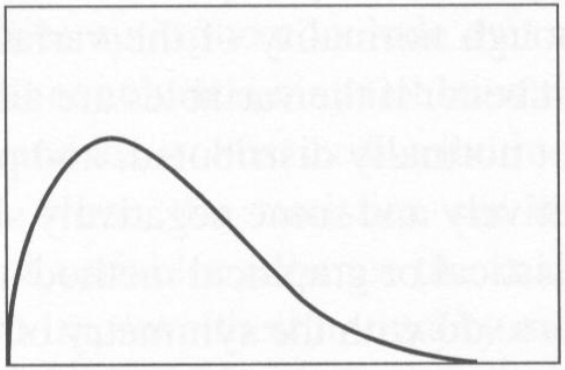
$$Kurt(X) = \frac{\mathrm{E}[(X-\mu)^4]}{\sigma^4}$$

- Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution.
- That is, data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails.
- Data sets with low kurtosis tend to have a flat top near the mean rather than a sharp peak.
- A uniform distribution would be the extreme case.

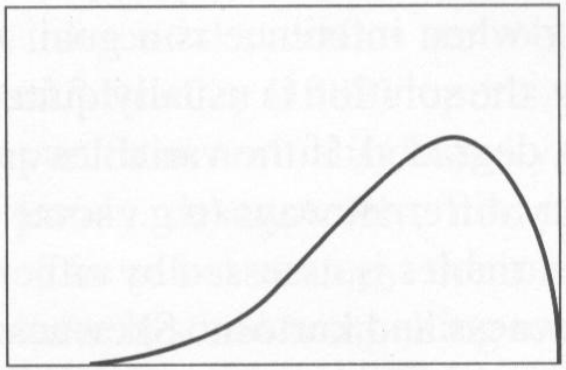
- If the skewness is negative (positive) the distribution is skewed to the left (right).
- Normally distributed random variables have a skewness of zero since the distribution is symmetrical around the mean.
- Normally distributed random variables have a kurtosis of 3.
- Financial data often exhibits higher kurtosis values, indicating that values close to the mean and extreme positive and negative outliers appear more frequently than for normally distributed random variables



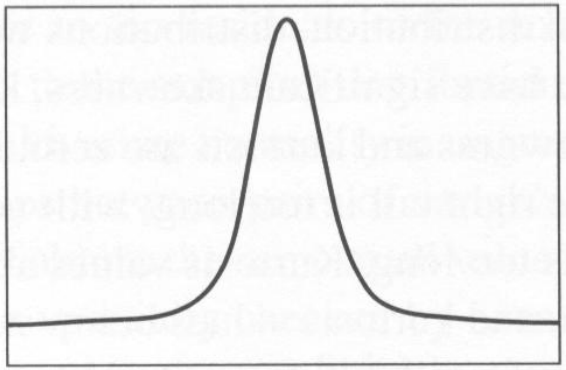
Normal



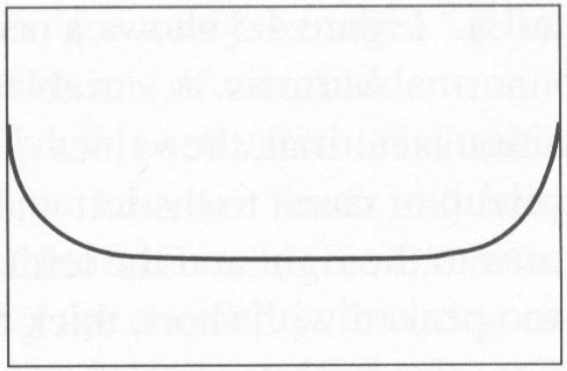
Positive skewness



Negative skewness



Positive kurtosis



Negative kurtosis

KURTOSIS

- Kurtosis (*peakedness of a distribution*)