Normalization

Formula $X_{new} = \frac{X_i - \min(x)}{\max(x) - \min(x)}$

Price	New_Price (after Normalization)
110	0,2
105	0,1
120	0,4
110	0,2
130	0,6
150	1,0
100	0,0
105	0,1
115	0,3

min = 100

max = 150

Standardization

Formula $X_{new} = \frac{Y_i - X_{mean}}{\text{Standard-deviation}}$

Standard deviation $\sigma = \sqrt{\frac{\Sigma (x_i - \mu)^2}{N}}$

$N = 9$

$\mu = 116.111$

$$= \sqrt{(110-116,111)^2 (0,461+}$$

$$\sqrt{259,564+122,454.}$$

$$6 = \sqrt{\frac{37,344+123,454+1,234+15,124+37,344+192,904+1148,964}{9}}$$

$$= \sqrt{\frac{1938,886}{9}}$$

$$= \sqrt{215,432} = 14,675.$$

Price	New-Price (standardization)
110	-0,416
105	-0,757
115	-0,076
120	0,265
110	-0,416
130	0,946
150	2,308
100	-1,097
105	-0,757

Log Transformation:

$\text{Log1p}(x) = \log_e(1+x)$

price	Price-scaled (log-trans
110	4,709
105	4,663
115	4,754
120	4,796
110	4,709
130	4,875
150	5,017
100	4,615
105	4,663

Robust - Scaler

$$X_{scale} = \frac{X_i - X_{med}}{X_{75} - X_{25}}$$

IQP = ~~75~~ quantiles - 25 quantile

$$Q_1 = \frac{1}{4}(n+1)^{th} \text{ term} = \frac{1}{4}(9+1) = 105$$

$$Q_3 = \frac{3}{4}(n+1)^{th} \text{ term} = \frac{3\times 10}{4} = \frac{30}{4} = 120$$

$$Q_2 = \frac{2}{4}(n+1) \longrightarrow = \frac{2\times 10}{4} = \frac{20}{4} = 110$$

110, 105, 115, 120, 110, 130, 150, 100, 105

Sorting = 100, 105, 105, 110, 110, 115, 120, 130, 150

Price	New-Price (Robust)
110	~~0~~ 0,0
105	-0,3333
115	0, 3333
120	~~0,6666~~ 0,666
110	0, 0
130	1,3333
150	2,6667
100	-0,6667
105	~~0,3125~~ 0,3333

Max- Absolute Scaler

formula $X_{scaled} = \left(\frac{x}{abs(max(x))} \right)$

Price	Price - New (Max Abs)
110	0,7333
105	0,7000
115	0,7667
120	0,8000
110	0,7333
120	0,8667
150	1,0000
100	0,6667
105	0,7000

here - max(Price) = (150)