* measure of position

① Quartile

[10, 20, 30, 40, 50, 60, 70, 80, 90, 100]

median $= \frac{50+60}{2} = 55$

$Q_1 = 30$

$Q_3 = 80$

median = 55

min = 10

max = 100

② Percentile -

75

[2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12]

25

Percentile of 10 position

$$\text{percentile} = \frac{16}{19+1} \times 100$$

$$= \frac{16}{\cancel{20}} \times \cancel{100}^{5}$$

$$= 80\%.$$

Case II - 8^{th}

$$= \frac{10}{19+1} \times 100$$

$$= 50\%..$$

② Percentile rank -

$$= \frac{\text{Percentile}}{100} \times (n+1)$$

Case-I $\underline{\underline{25\%.}}$

$$= \frac{\cancel{25}}{\cancel{100}_{4}} \times \cancel{20}^{5}$$

$= 5$

Case-II

75 %.

$= \frac{75}{100} \times 20$

$= 15$

③ Interquartile Range -

$Q_1 = 25\%$

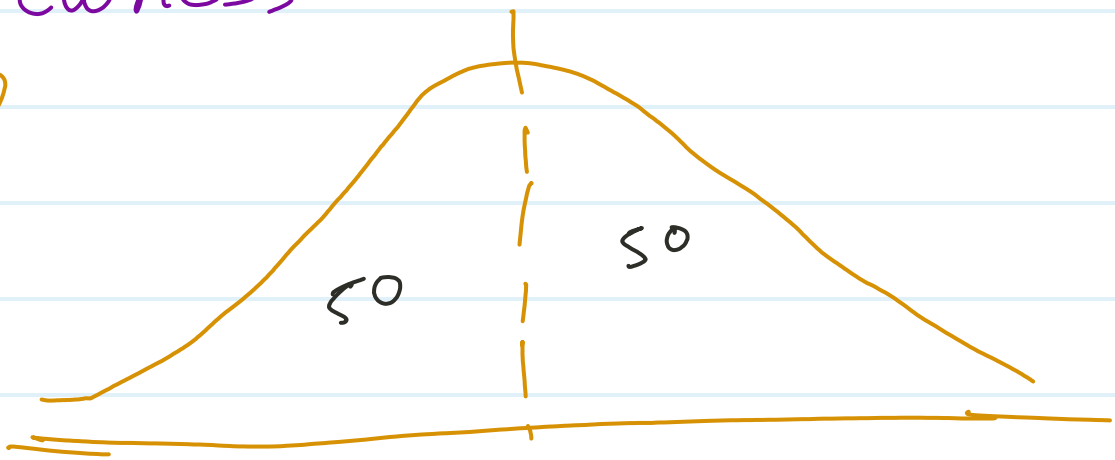
median $= 50\%$

$Q_3 = 75\%$

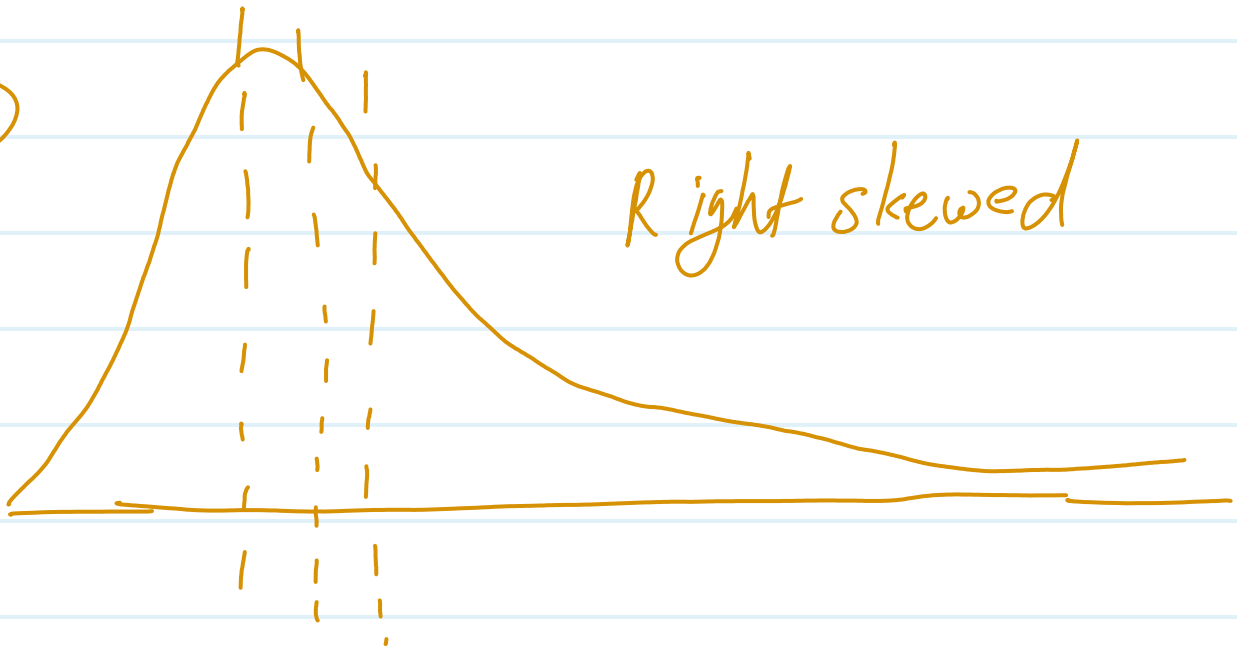
$IQR = Q_3 - Q_1$

✡ measure of shape

① skewness –

① 

zero skewed

② 

Right skewed

mean > median > mode

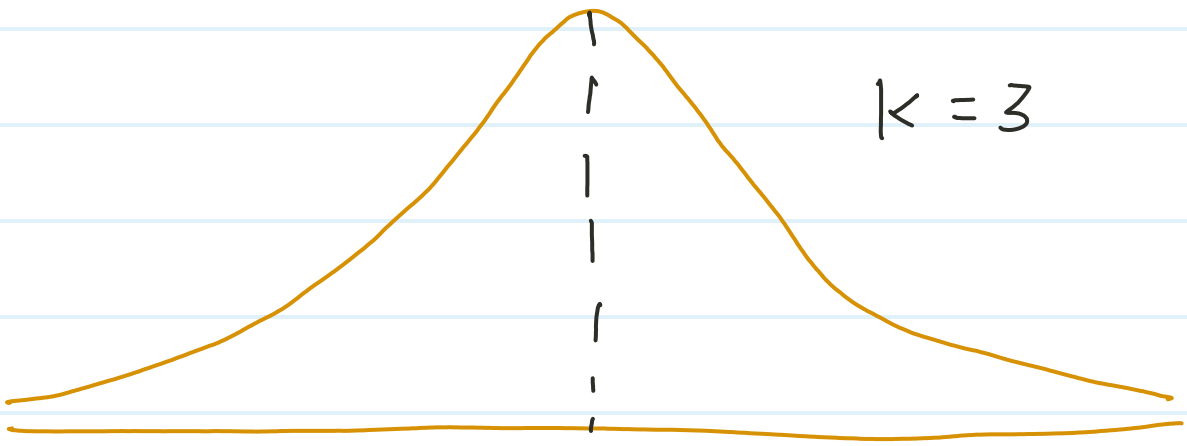
③ Left skewed

mean < median < mode

② kurtosis -

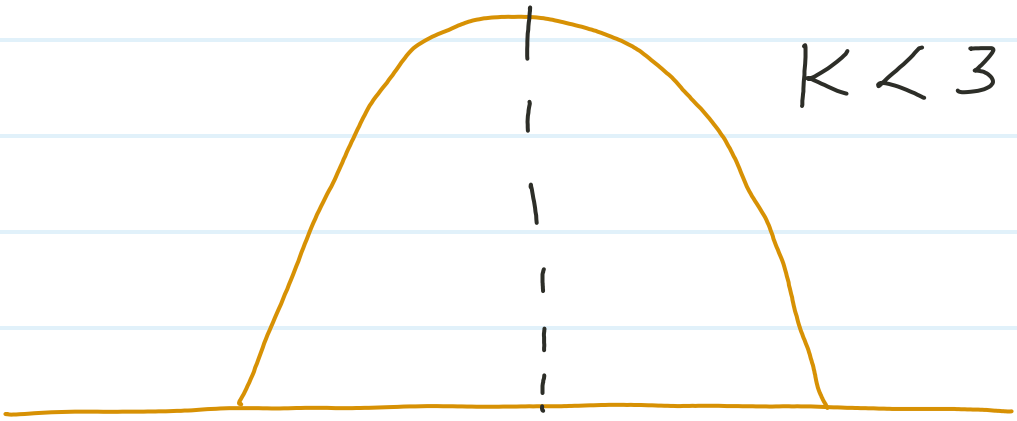
$K = 3$

① mesokurtosis -

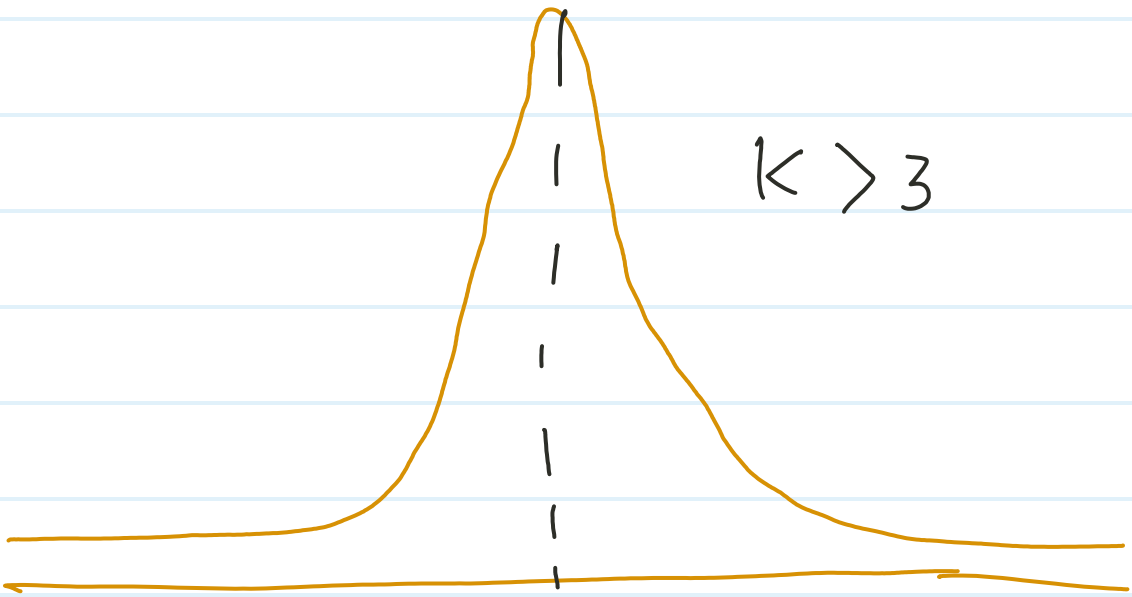


$K = 3$

② platikurtosis –



③ Lepto kurtosis –



③ Box and whiskers plot

5 number summery

min

max

Q_1

Q_3

meeban

[2, 5, 6, 3, 7, 11, 1, 4, 7, 2, 3, 4, 8, 12, 29, 99]

lower fence / limit

Upper fence / limit

$$Q_1 = \frac{\cancel{25}}{\cancel{100}_4} \times 17 \Rightarrow 4.25$$

$$Q_3 = \frac{\cancel{75}^3}{\cancel{100}_4} \times 17 \Rightarrow 12.75$$

$$IQR = Q_3 - Q_1$$

$$\Rightarrow 12.75 - 4.25$$

$$= 8.5$$

$$\text{lower limit} = Q_1 - 1.5\ IQR$$

$$= 4.25 - 1.5 \times 8.5$$

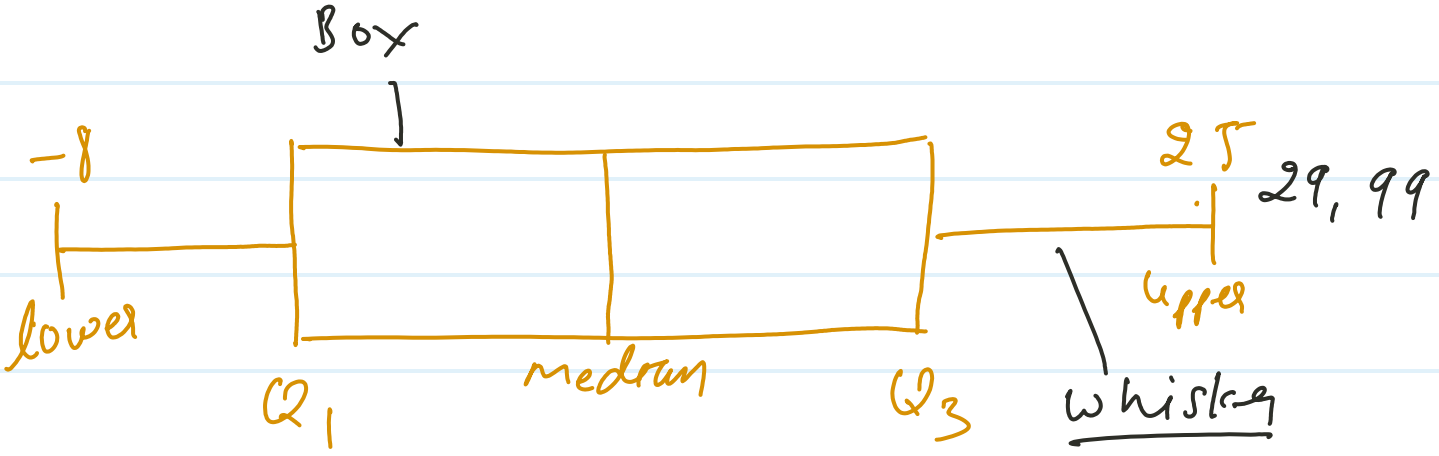
$$= 4.25 - 12.75$$

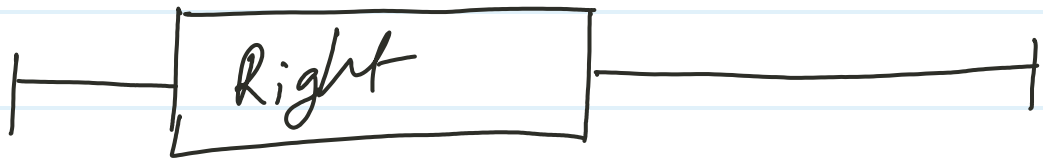
$$\Rightarrow -8.5$$

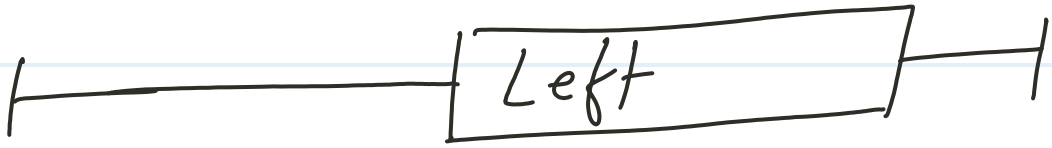
$$\text{Upper limit} = Q_3 + 1.5\ IQR$$

$$= 12.75 + 1.5 \times 8.5$$

$$\Rightarrow 25.5$$







X	
2	2
3	3
6	3
7	6 – median
35	7
40	35 – 6
NA	40 – 6
3	

mean

median – outliers

mode

$$\frac{96}{7} = 13.71$$

$$\frac{33}{7} = 4.71$$

X_1	X_2
T	10th
F	12th
—	—
T	10th
T	Graduate
T	—
—	12th
F	Graduate
	—
	10th

mode = T

Variables

$X = 4$

Type of variable

- Quantitative
  - Descrite quan. var.
  - Continous quan. var.
- Qualitative
  - Nominal qual. var.
  - ordinal qual. var.

X_1	X_2	X_3	X_4
2	2.1	M	10th
3	3.2	F	gradate
4	4.5	T	PhD.
6	6.7	M	–
7	0.1	F	=
8	-1.1	f	–

Random Variable

$X = 4$

$X \approx y$

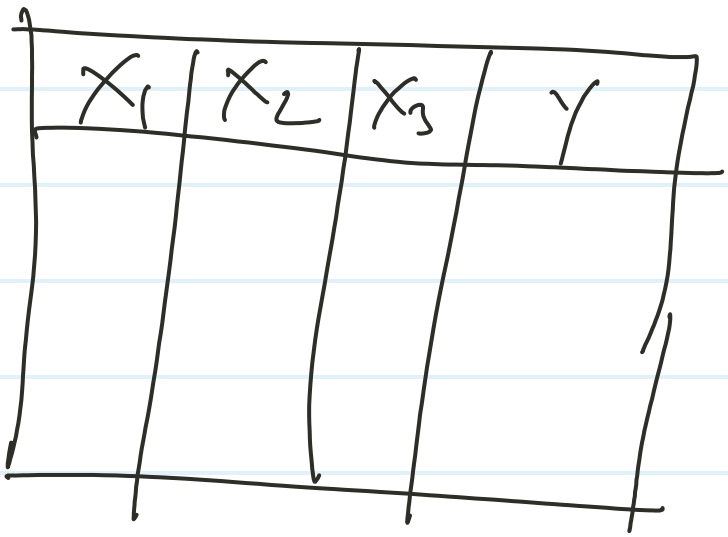
Type of Random variable

- Descrite Random variable
  - whole numbes
- Continues Random variable
  - Deeimal,

Independent variable OR features

Dependent variable OR Target variable

	X_1	X_2	X_3	X_4	y
loan	✓	✓	✓	✓	—



X_1 = Marks