Percentile & Quartile

Percentile:

Percentage = {1, 2, 3, 4, 5, 6}

odd numbers = 3

% of odd number = $\frac{3}{6} \times 100 = 50\%$

A percentile is a value below which certain percentage of observations lie

$$\text{Percentile of } x = \frac{\#\text{values below } x}{\text{Sample Size}} \times 100$$

(# values below x: # ↗ number)

values = {2, 2, 3, 4, 5, 5, 6, 7, 8, 8, 8, 9, 9, 10}

Percentile of 9 = $\frac{11}{14} \times 100 = 78.57$

78.57% values are less then 9 in entire distribution

↳ Percentile ranking

Say if I want to find 25 percentile of value

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

So for above sample $\frac{25}{100} \times 15 = 3.75$

3.75^{th} element will be 25 percentile

but as there can not be 3.75^{th} element we can take mean of 3 & 4 element = $\frac{3+4}{2} = 3.5$

So for above sample = 3^{rd} element = 3
4^{th} element = 4

So per value for 25^{th} percentile is 3.5
everything below 3.5 will be part of 25 percentile

Quartile:

Say we calculate 25, 50, 75 percentile

25 percentile = 1^{st} quartile

50 percentile = 2^{nd} quartile

75 percentile = 3^{rd} quartile