

CHAPTER 13 - probability & statistics

just starting

• mean
↳ add all numbers and divide by # of data points

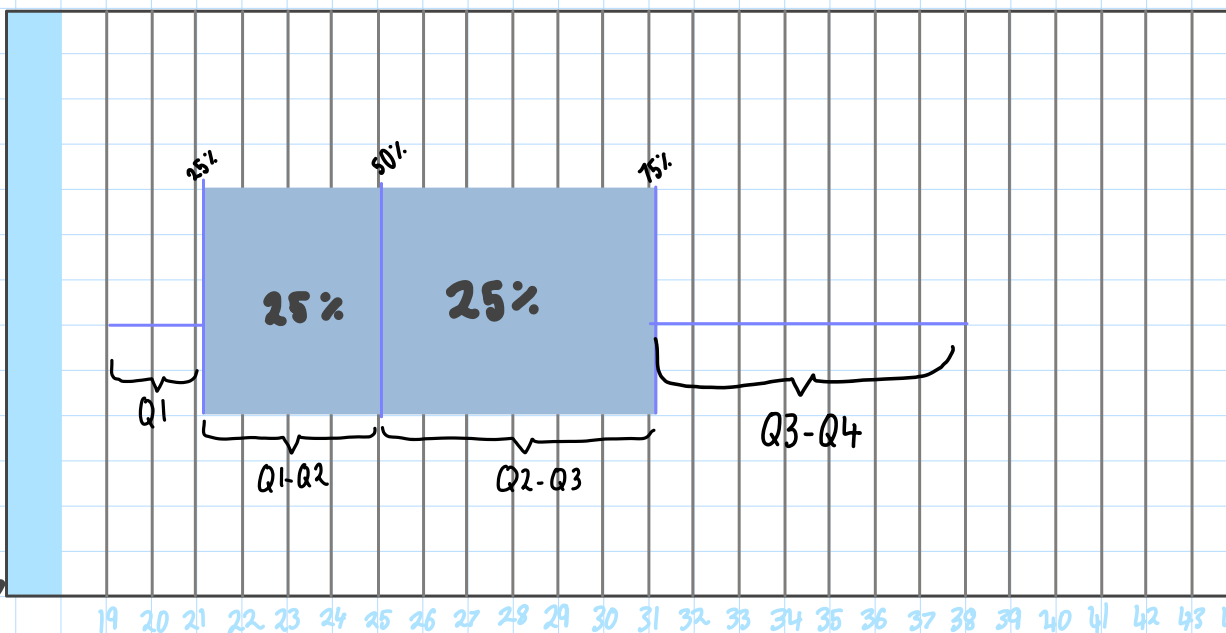
• median
↳ middle number/average of middle numbers

• mode
↳ appears the most

• "product"
↳ (score)(frequency)

data points:
19, 21, 21, 21, 23, 24, 25, 26, 29, 30, 32, 38

box plot



• quartile
↳ the data is broken into 4 equal parts
↳ denoted as Q1, Q2, Q3, Q4
* Q2 is the median
* Q4 is the maximum

\bar{x} (mean)	26.2308
$\sum x$	341
$\sum x^2$	9323
$s_x := s_n \dots$	5.61477
$\sigma_x := \sigma_n \dots$	5.3945
n (# of data points)	13
MinX	19
Q ₁ X	21
MedianX	25
Q ₃ X	31
MaxX	38
IQR	10

STEP ONE: break the points in half (find the median)

STEP TWO: find the median of lower & upper half (Q2)

STEP THREE: Q1 = median of lower half and Q3 = median of upper half

STEP FOUR: Q4 = largest valued number

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the table

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$\sum x^2$	9323
$s_x := s_n - \dots$	5.61477
$\sigma_x := \sigma_n - \dots$	5.3945
n (# of data pts)	13
Min X	19
Q_1X	21
Median X	25
Q_3X	31
Max X	38
IQR	10

IQR - range of box / $Q_3 - Q_1$

$\sum x$ - add all data points

$\sum x^2$ - add all squares of data points

n - number of data points

Min X - minimum value (in data set)

Q_1X - 25 percentile / 1st quartile

Median X - over all median / 50 percentile / 2nd quartile

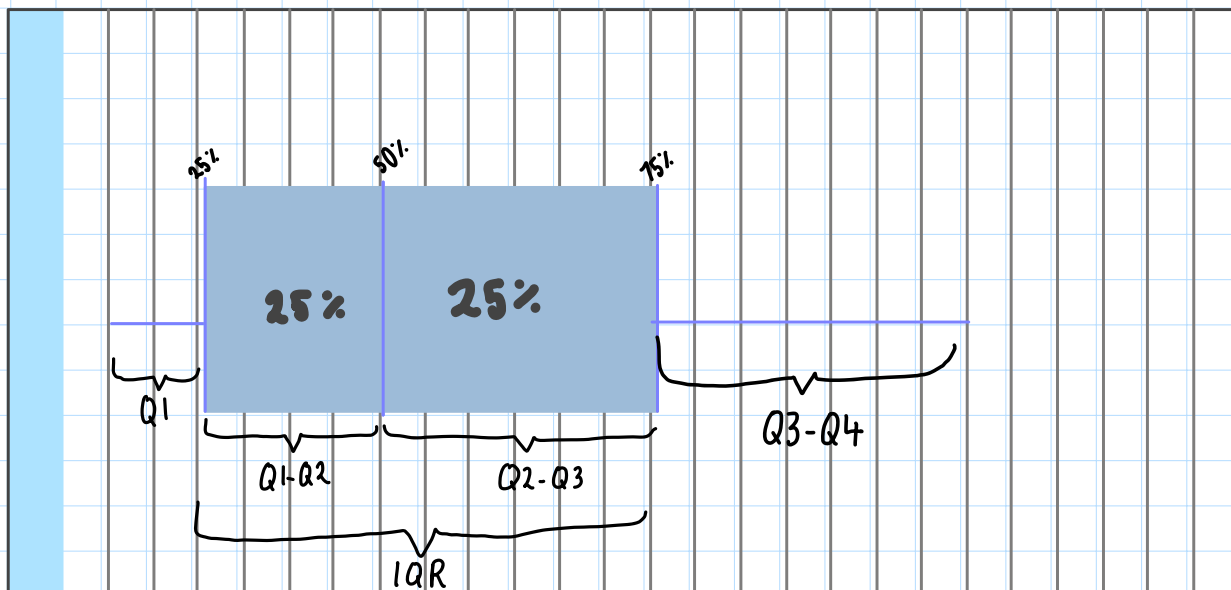
Q_3X - 75 percentile / 3rd quartile

Max X - maximum value (in data set)

x_j - each value

σ - population standard deviation

s_x - sample standard deviation



19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

IQR!

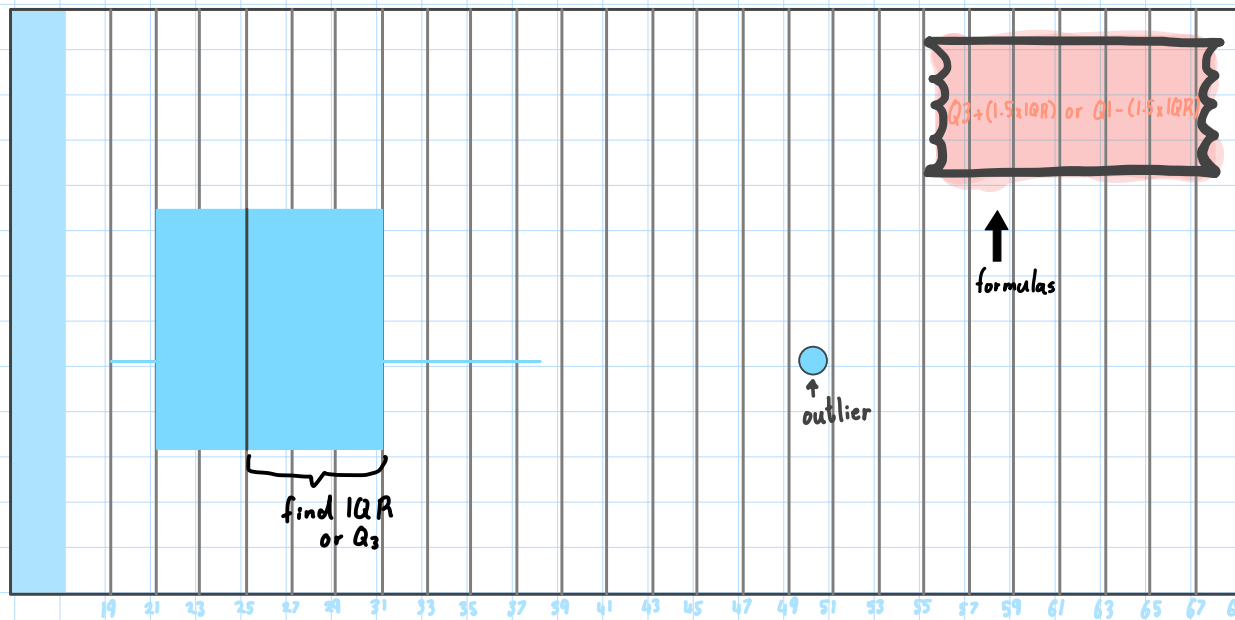
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a new twist

- outlier a point that is 1.5 times the IQR from Q_3 / viceversa for Q_1

data set:
19, 21, 21, 21, 23, 24, 25, 26, 29, 30, 32, 32, 38, 50

50
a new point



$$Q_3 = 31$$

$$31 + (1.5 \times 10)$$

$$31 + 15$$

$$46$$

46 is closer to 50 than 38
so 50 is the outlier

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

$$s_x = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$$