V. Location ← find the data value

eg I want to know 75th of the score for this class.

steps: 1. Sort the data values

2. Compute the location L, where

$$L = *\% \cdot n$$ ← L = percentile · total

eg $L = 0.75 \cdot 34$

A. If L is an integer, then count it.

B. If L is a decimal, then $\frac{L^{th}\text{ value} + (L+1)^{th}\text{ value}}{2}$

→ L = 7.8,

$$\text{data} = \frac{7^{th}\text{ value} + 8^{th}\text{ value}}{2} = \text{"86"}$$

eg 1, 3, 5, 7, 10

If L = 2, data = 3 ← data value

If L = 3, data = 5

If L = 5, data = 10

If L = 1.7, $\text{data} = \frac{1\text{st data} + 2\text{nd data}}{2} = \frac{1+3}{2} = 2$

If L = 3.3, $\text{data} = \frac{3^{rd}\text{ data} + 4^{th}\text{ data}}{2} = \frac{5+7}{2} = 6$

eg 4, 6, 10, 15

If $L = 1$, data = 4

If $L = 3$, data = 10

If $L = 2.7$, data $= \frac{\text{2nd data} + \text{3rd data}}{2} = \frac{6 + 10}{2} = 8$

If $L = 3.9$, data $= \frac{\text{3rd data} + \text{4th data}}{2} = \frac{10 + 15}{2} = 12.5$

eg 1, 2, 3, 5, 7, 9, 10

If $L = 6.4$, data $= \frac{\text{6th data} + \text{7th data}}{2} = \frac{9 + 10}{2} = 9.5$

If $L = 5$, data = 7

Eg Find the data value of the 18th percentile.

19	19	20	20	20	20	22	22	22	22
23	23	23	23	23	23	23	24	24	24
24	24	25	25	25	25	25	25	25	26
26	26	26	26	26	27	27	28	28	30

7th 8th

← 40, sort

S: $n = 40$, $18\% = 0.18$ ← keep it simple

$L = 0.18 \cdot 40 = 7.2$

$P_{18} = \frac{\text{7th data} + \text{8th data}}{2}$

$= \frac{22 + 22}{2}$

2

$= \boxed{22}$ chips

Eg Find the data value of the 75th percentile.

10th

19	19	20	20	20	20	22	22	22	22
23	23	23	23	23	23	23	24	24	24
24	24	25	25	25	25	25	25	25	26
26	26	26	26	26	27	27	28	28	30

← 30th

S: $L = 0.75 \cdot 40 = 30$

$P_{75} = \boxed{26}$ chips

Eg Find the data value of the 48th percentile.

19	19	20	20	20	20	22	22	22	22
23	23	23	23	23	23	23	24	24	24
24	24	25	25	25	25	25	25	25	26
26	26	26	26	26	27	27	28	28	30

19th 20th

S: $L = 0.48 \cdot 40 = 19.2$

$\text{Data} = \frac{24 + 24}{2}$

$= \boxed{24}$ chips

Eg. Given the sorted list of 20 values:

8th

3 5 6 7 8 9 11 12 14 18 20 24 26

27 28 30 33 34 35 40

Eg. Given the sorted list of 20 values: 8th

3 5 6 7 8 9 11 12 14 18 20 24 26

27 28 30 33 34 35 40.

Find the value of P_{40}.

S: $L = 0.4 \cdot 20 = 8$

$P_{40} = \boxed{12}$

Eg. Given the sorted list of 20 values: 9th 10th

3 5 6 7 8 9 11 12 14 18 20 24 26

27 28 30 33 34 35 40.

Find the value of P_{47}.

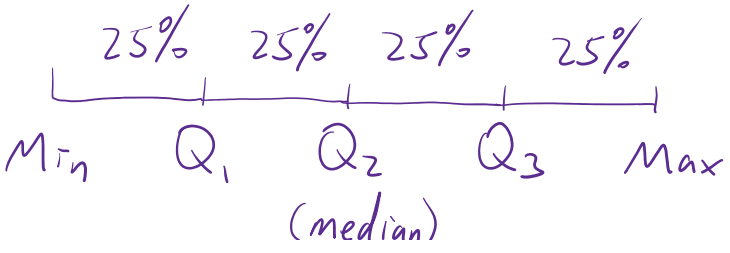
S: $L = 0.47 \cdot 20 = 9.4$ ← 9 9.4 10

$P_{47} = \frac{14 + 18}{2}$

$= \boxed{16}$

iii. Quartile ← 25th

It is a special measure of position for the n number data value. It divides into 4 interval



Min Q_1 Q_2 Q_3 Max
(median)

We have the 5-number summary:

They are as following: Minimum, first quartile Q_1, second quartile Q_2 (median), third quartile Q_3 and Maximum

Eg Find the 5-number summary for the following:

									10th ↓
19	19	20	20	20	20	22	22	22	22
23	23	23	23	23	23	23	24	24	24 ✓
24	24	25	25	25	25	25	25	25	26
26	26	26	26	26	27	27	28	28	30

← 40

S: min = 19 ✓, max = 30 ✓

$L_{25} = 0.25 \cdot 40 = 10$

$Q_1 = \boxed{22}$

$L_{50} = 0.5 \cdot 40 = 20$

$Q_2 = \boxed{24}$

$L_{75} = 0.75 \cdot 40 = 30$

$Q_3 = \boxed{26}$

The 5-number summary: $\boxed{19, 22, 24, 26, 30}$

Eg Find the 5-number summary for the following datas:

32	27	26	20	17	39	41	23	24	27

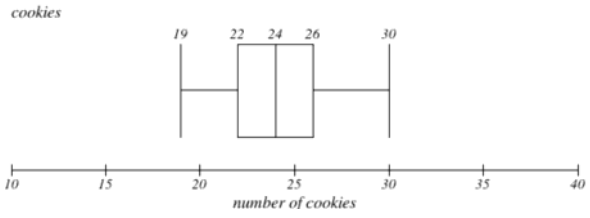
S: Stat → 1: Edit → CALC → 1: 1-Var Stats

VI. Boxplot

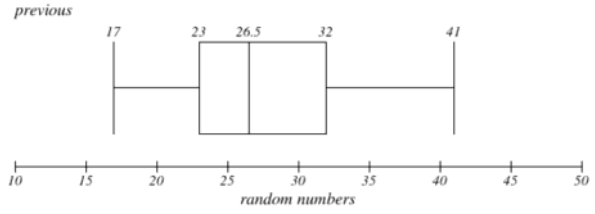
It gives a series of distribution, which it displays the distribution for a 5-number summary

https://www.imathas.com/stattools/boxplot.html

or: TI-84 ← highly recommend

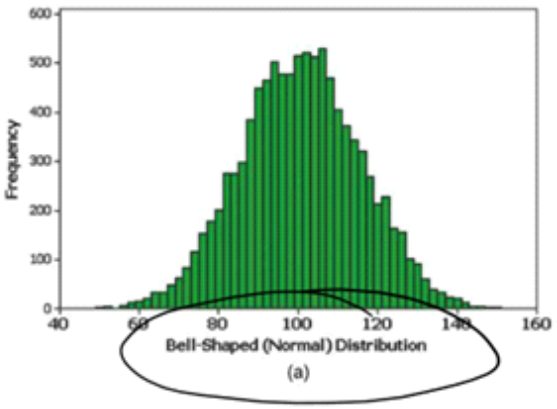


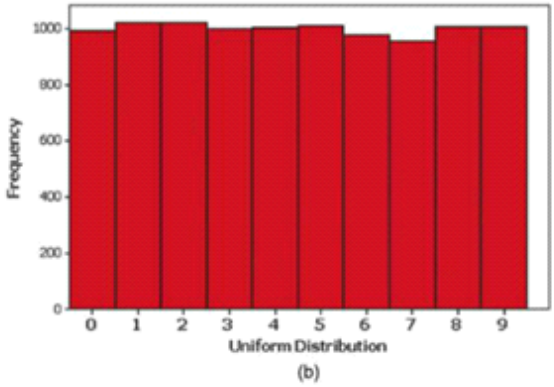
eg

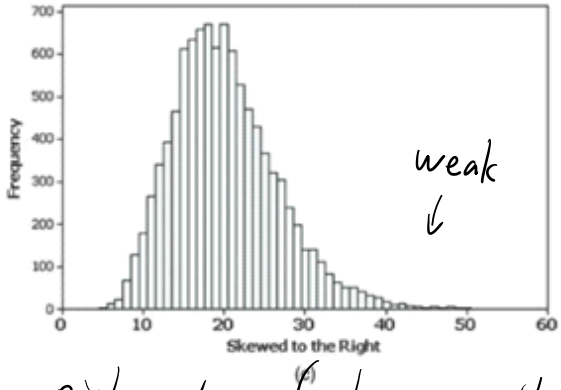


TI-84: Statplot → on → graph → Zoom → 9: ZoomStat

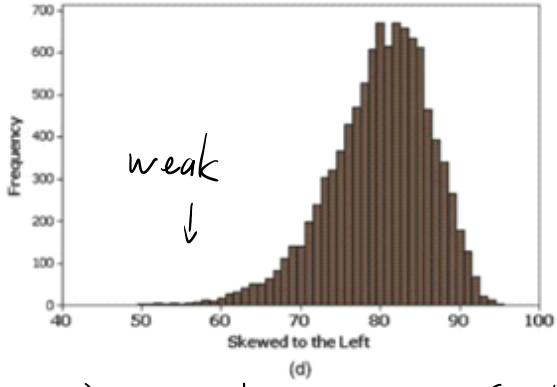
eg. Discuss the Shape







weak ↓



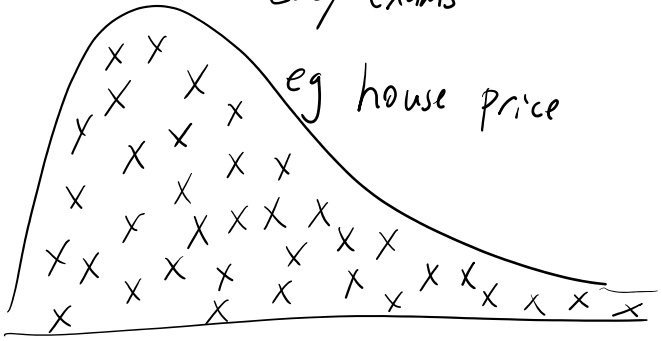
weak ↓

right-skew (skew to the right)

left-skew (skew to the left)

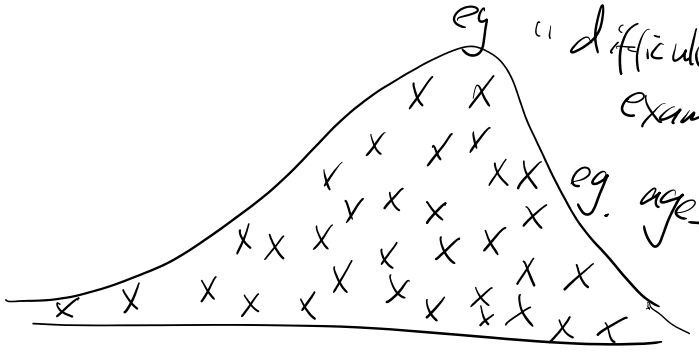
eg "Easy exams"

eg house price



eg "difficult exams"

eg. ages



x's are random variables.