MORE CALC.

ex

$$\int_{3}^{5} x^3 - 2x \, dx = \left(\underbrace{\frac{x^4}{4} - \frac{\cancel{2}x^2}{\cancel{2}}}_{\text{ANTIDERIV.}}\right)\Bigg|_{3}^{5}$$

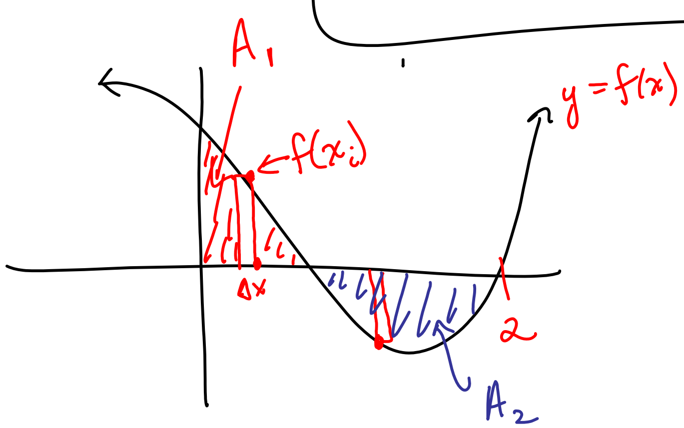
$\leftarrow$ UPPER BOUND

INTEGRAND

LOWER BOUND

BOUNDS

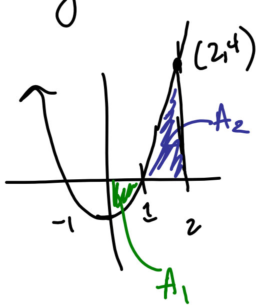
$$= \left(\frac{5^4}{4} - 5^2\right) - \left(\frac{3^4}{4} - 3^2\right)$$



$$\underbrace{\int_{0}^{2} f(x)\, dx}_{} = \lim_{n\to\infty} \sum^{n} f(x_i)\,\Delta x$$

$$= A_1 - A_2$$

FIND THE AREA BOUND BY THE x-AXIS AND $y = x^2 - 1$ BETWEEN 0 AND 2.

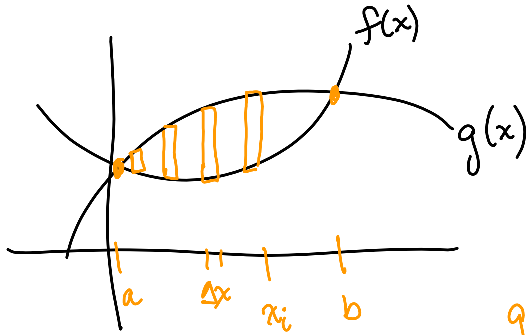


$$A_2 = \int_{1}^{2} x^2 - 1\, dx = \left(\frac{x^3}{3} - x\right)\Big|_{1}^{2} = \left(\frac{8}{3} - 2\right) - \left(\frac{1}{3} - 1\right) = \frac{4}{3}$$

$$A_1 = \left|\int_{0}^{1} x^2 - 1\, dx\right| = \left|\left(\frac{x^3}{3} - x\right)\Big|_{0}^{1}\right| = \left|\left(\frac{1}{3} - 1\right) - (0)\right|$$

$$= 2/3$$

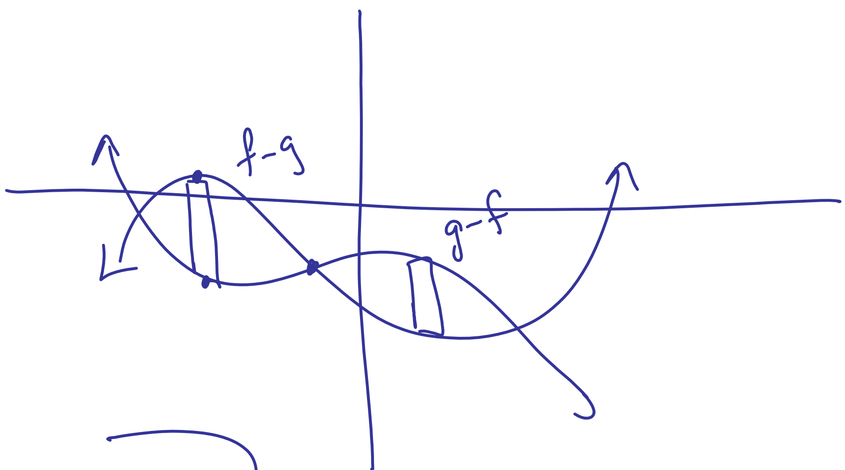
TOTAL AREA $= \frac{4}{3} + \frac{2}{3} = 2$



$$\int_a^b \underline{g-f} \; dx$$

$\uparrow$ width

$g(x_i)-f(x_i)$



SEQUENCES & SERIES

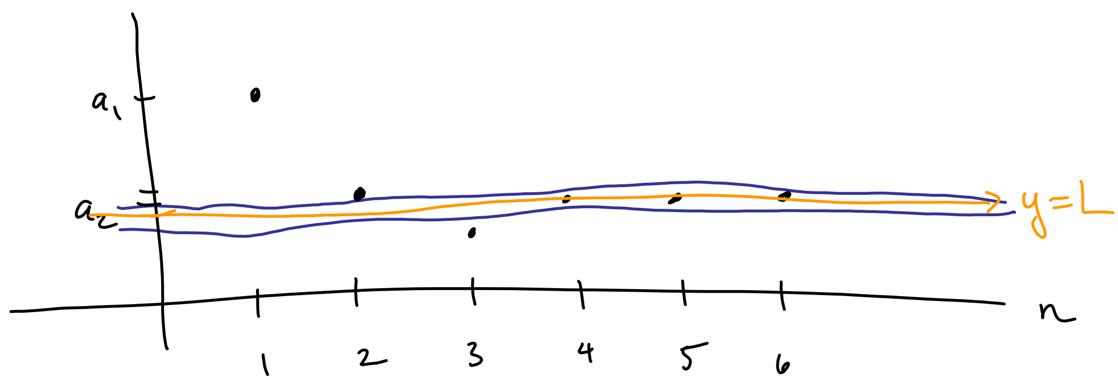
$a_0, a_1, a_2, \ldots$ $\leftarrow$ SEQ. $\{a_n\}$ ex $\left\{\frac{n-1}{n}\right\}_{n=1}^{\infty}$

$\hookrightarrow 0, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \ldots$

$a_0 + a_1 + a_2 \quad \ldots$ $\leftarrow$ SERIES $\displaystyle\sum_{n=2}^{5} \frac{1}{n} = \frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}$

SEQUENCES

A SEQUENCE CONVERGES IF THE FOLLOWING PICTURE HAPPENS:



$$\left\{\frac{1}{n}\right\}_{n=1}^{\infty} = \left\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \ldots\right\}$$

$$\lim_{n\to\infty} \frac{1}{n} = 0$$

$$\left\{(-1)^n\right\}_{n=0}^{\infty} = \left\{1, -1, 1, -1 \ldots\right\}$$ DOES NOT CONVERGE

$$\left\{n!\right\}_{n=1}^{\infty} = \left\{1!, 2!, \ldots\right\}$$ DIVERGES TO $+\infty$

$$(5! = 5\cdot4\cdot3\cdot2\cdot1)$$

SERIES

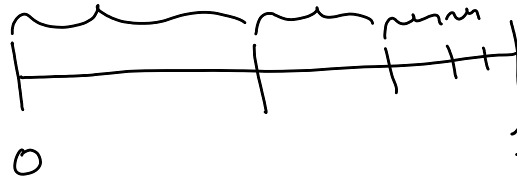
$\sum_{n=0}^{\infty} a_n \leftarrow$ THE SUM OF THIS IS

$$\lim_{k\to\infty} \sum_{n=0}^{k} a_n$$

$\leftarrow$ k^{th} PARTIAL SUM

$$\sum_{n=0}^{\infty}\left(\frac{1}{2}\right)^n = 1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\dots = 2$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8}+\frac{1}{16}+\dots = 1$$



$$\sum_{n=0}^{\infty}\left(\frac{1}{3}\right)^n$$

GEOMETRIC SERIES

$$\sum_{n=0}^{\infty} r^n, \quad |r|<1$$

$$= \frac{1}{1-r}$$

$$1+\frac{1}{3}+\left(\frac{1}{3}\right)^2+\dots = S$$

$$-\left(\frac{1}{3}+\left(\frac{1}{3}\right)^2+\left(\frac{1}{3}\right)^3+\dots = \frac{1}{3}S\right)$$

$$1 = S - \frac{1}{3}S$$

$$1 = S\left(1-\frac{1}{3}\right) \rightarrow \frac{1}{1-\frac{1}{3}} = S$$

$$S = \frac{3}{2} \leftarrow = \sum_{n=0}^{\infty}\left(\frac{1}{3}\right)^n$$

ex

$$0.\overline{9} = 0.99999\dots$$

$$= 0.9 + 0.09 + 0.009 + \dots$$

$$= \frac{9}{10} + \frac{9}{10^2} + \frac{9}{10^3} + \dots = \sum_{n=0}^{\infty}\frac{9}{10}\cdot\left(\frac{1}{10}\right)^n$$

$\cos 0$

$$= \frac{9}{10}\sum_{n=0}^{\infty}\left(\frac{1}{10}\right)^n = \frac{9}{10}\cdot\frac{1}{1-\frac{1}{10}} = \frac{9}{10}\cdot\frac{10}{9} = 1 \qquad \frac{3}{3}$$

r

$\frac{5}{5}$

π^0

STATISTICS

- CHART / TABLES

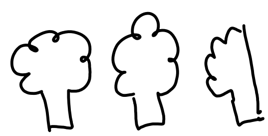
FREQ TABLE

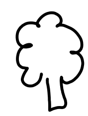
VAL	# of occurance

RELATIVE FREQ TABLE

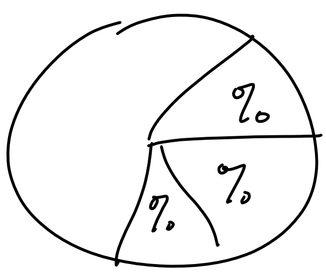
VAL	% occur. of value

- PICTOGRAPH

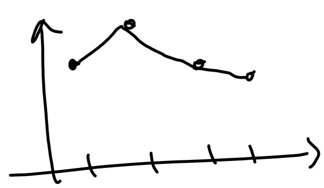


 = 1M Acres

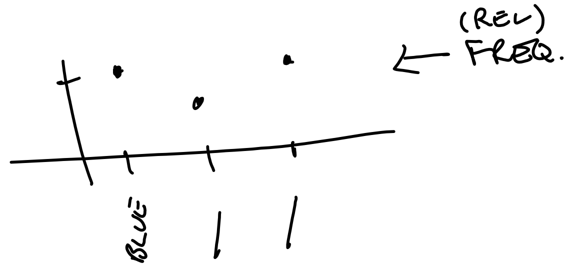
- PIECHART



- LINE GRAPH



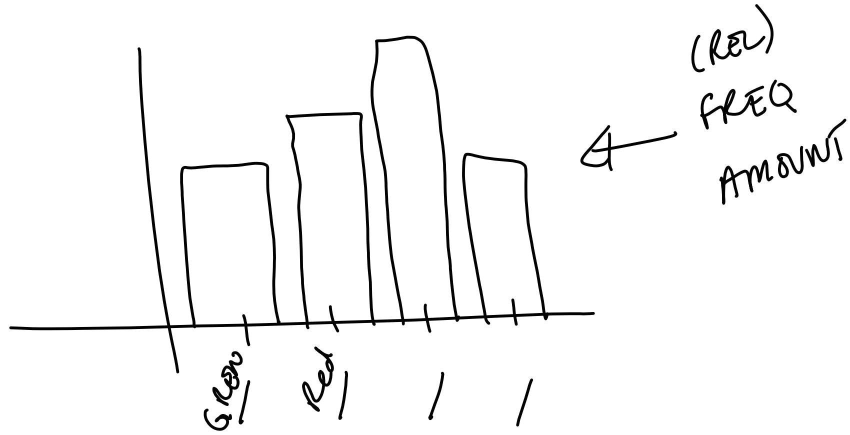
- DOT PLOT



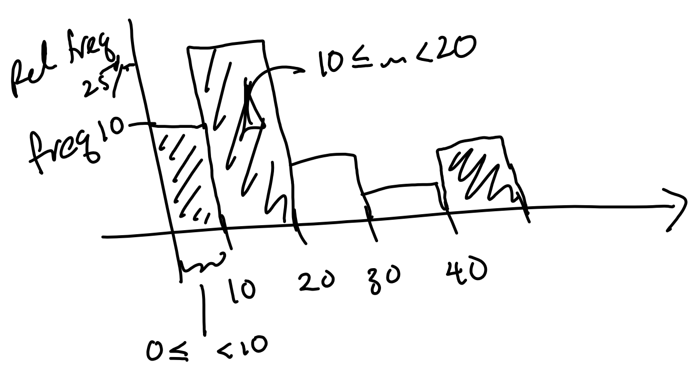
STEM	LEAF
3	1 5 6
2	2 1
1	7 9
0	5

$\{31, 35, 36, 22, 21, 17, 19, 5\}$

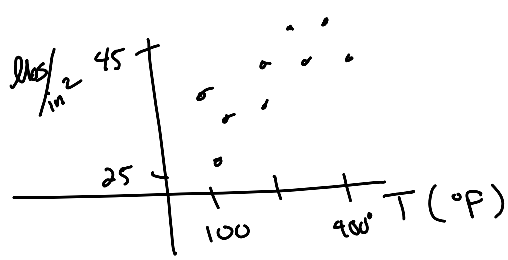
- BAR GRAPH



- HISTOGRAM



- SCATTER PLOT



(P, T)

DATA $\{5, 7, 2, 0, 38, \ldots\}$

LIST of NUMBERS

$\{(5,2)\ (6,3)\ (7,4)\}$

(x,y) SCATTERPLOTS

REGRESSION

CORRELATION

Central tendency

- mean
  - not nec. PART of data
  - every data point affect it
  - outliers can change it a lot
- median
  - sometimes is datapt.
  - not so much
- mode
  - always a data pt. (if there is one)
  - umm not an outlier

weighted mean

value	freq	%
5	3	25%
6	2	10%
8	9	5%
10	1	60%

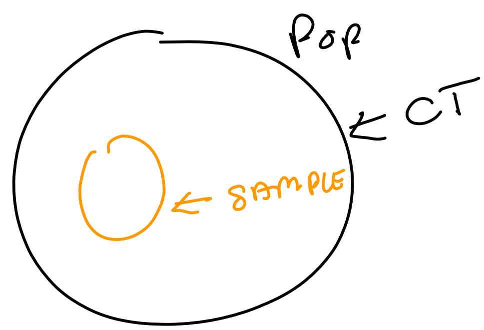
$$\frac{3\cdot 5 + 2\cdot 6 + 9\cdot 8 + 1\cdot 10}{3+2+9+1}$$

$$0.25\cdot 5 + 0.1\cdot 6 + 0.05\cdot 8 + 0.6\cdot 10$$

measures of dispersion

Range TOP # − BOTTOM #

minus.



STANDARD DEVIATION

Pop $\sigma = \sqrt{\dfrac{\sum (x-\mu)^2}{N}}$

μ IS MEAN

N IS SIZE OF pop.

SAMP

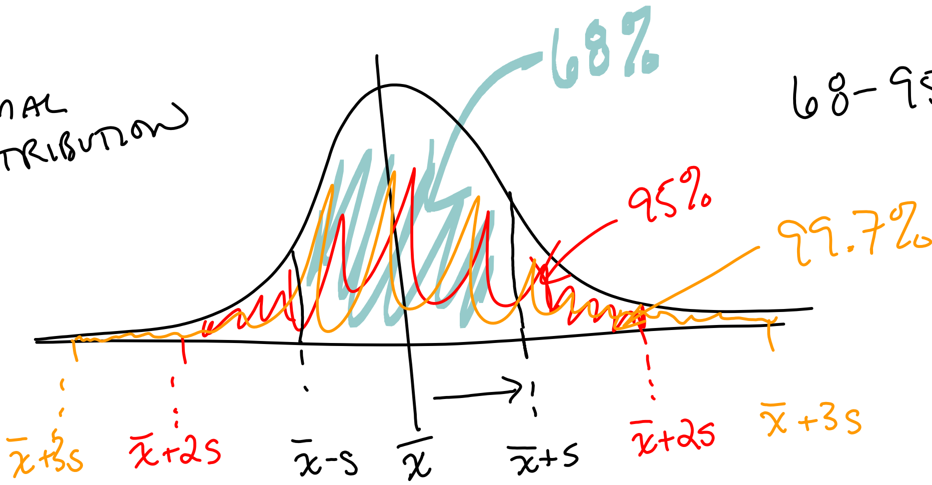
$$s = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$$

$\bar{x}$ IS MEAN

n IS SIZE OF SAMPLE.

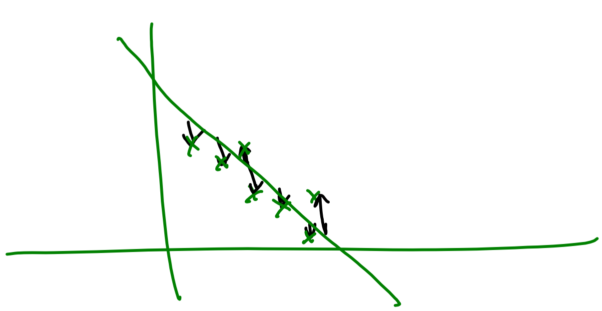
NORMAL DISTRIBUTION

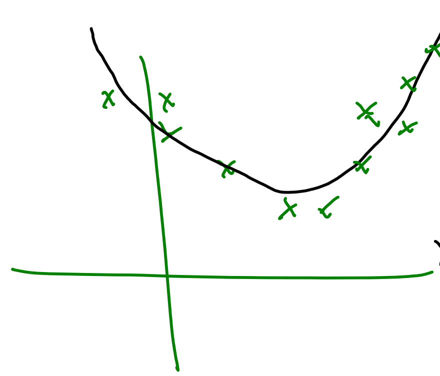
68-95-99.7 RULE

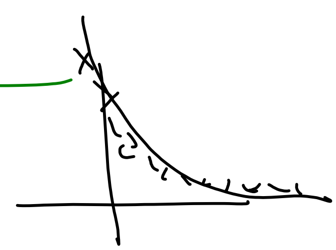


ex NORMAL. DIST DATA w/ MEAN 25 AND STD DEV 6. WHAT PERCENT OF THE DATA LIE BETWEEN 19 AND 37.

$$\left.\begin{array}{l} 19-31 - 68\% \\ 31-37 - 13.5\% \end{array}\right\} 81.5\%$$

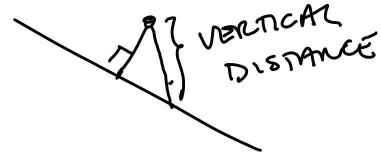






Regression line
LEAST SQUARES LINES.

MINIMIZES (VERTICAL DIST FROM
DATA POINTS TO LINE)^2



Correlation Coefficient

range from

-1 TO 0 TO 1

Perfect negative correlation

No correlation

Perfect positive correlation.