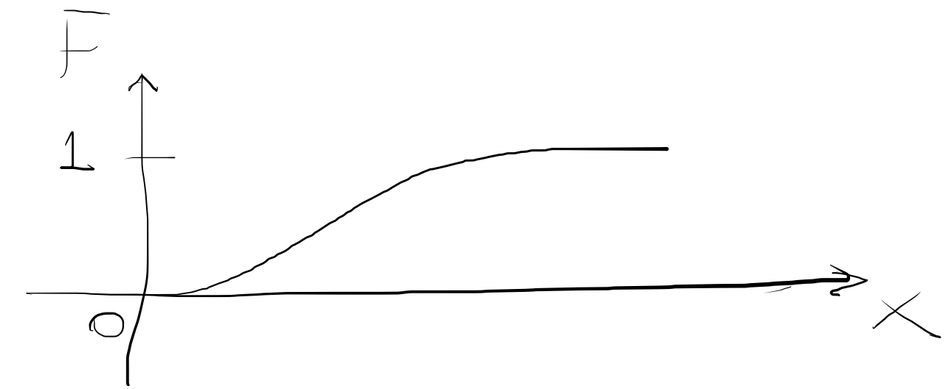
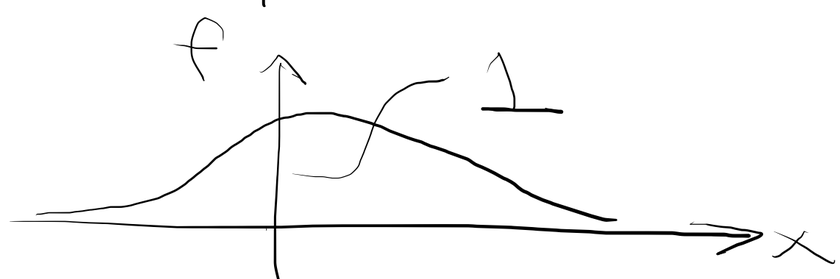
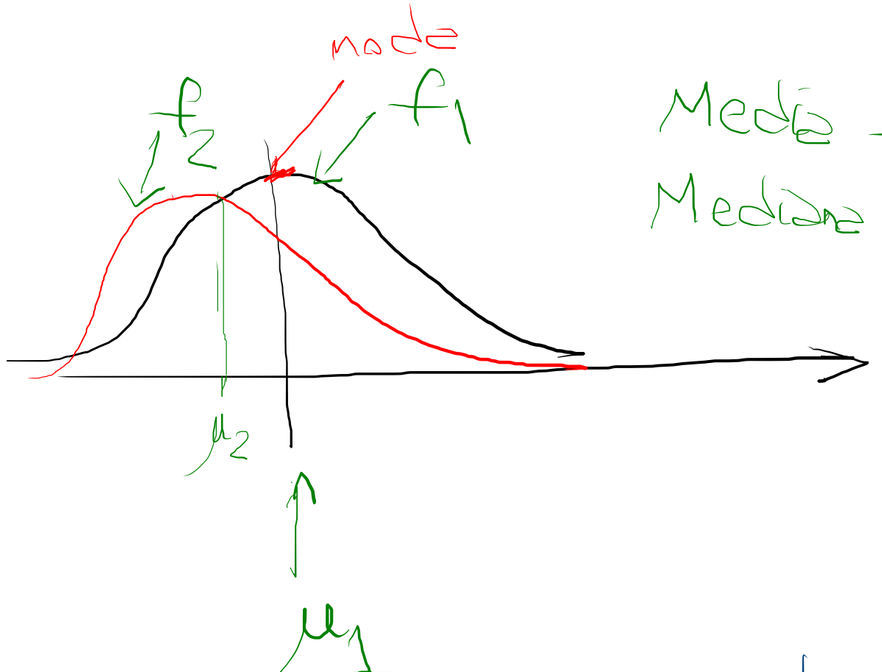
$$F(x) = P(X \leq x)$$

$$f(x) = \frac{\partial P}{\partial x}$$



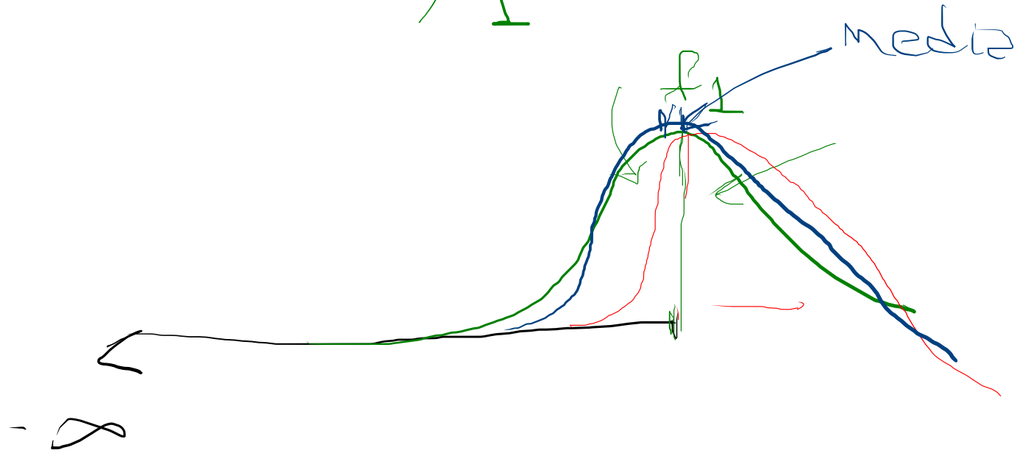


Media



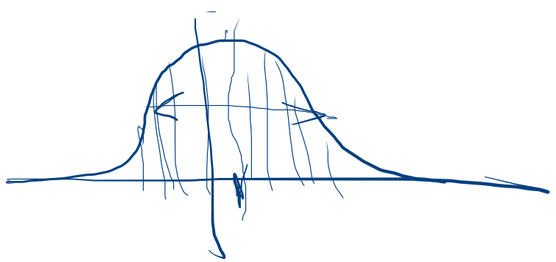
Media → centro de gravedad

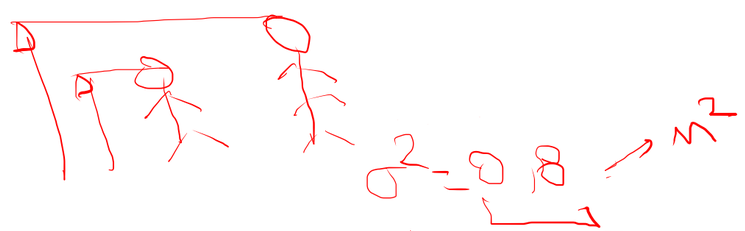
Mediana → 50%

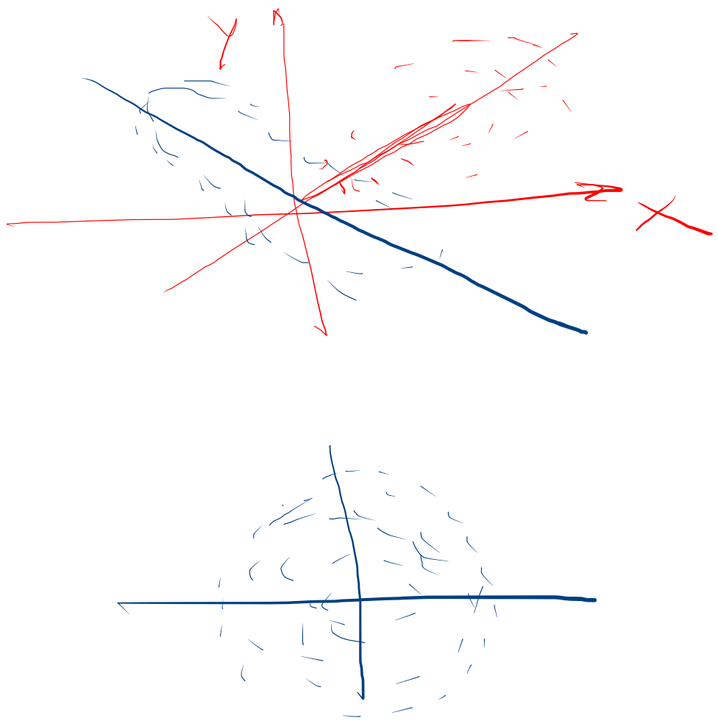


Varianza

Mide la variabilidad respecto de su valor medio.






Y
X

Función generadora de Momentos

$$M_X(t) = E\left[e^{tX}\right]$$

$$E\left[X^n\right] = \left.\frac{d^n}{dt^n} E\left[e^{tX}\right]\right|_{t=0} = M_X^{(n)}(0)$$

(derivada n-ésima)

$$\frac{dE\left[e^{tX}\right]}{dt} = E\left[X e^{tX}\right]\Big|_{t=0} = E[X]$$

$$f_X(x) = \begin{cases} \lambda e^{-\lambda x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

$$E[X] = \left. \frac{d}{dt} E[e^{tx}] \right|_{t=0}$$

$t < \lambda$

$$M_X(t) = E[e^{tx}] = \int_0^\infty e^{tx} \lambda e^{-\lambda x} dx = \lambda \int_0^\infty e^{(t-\lambda)x} dx$$

$$= \frac{\lambda}{\lambda - t}$$

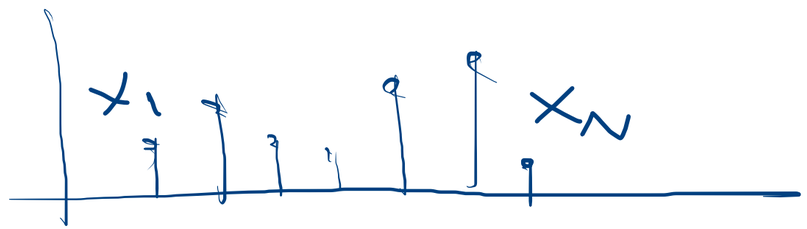
$$M_X(0) = 1$$

$$\frac{d\,M_X(t)}{dt} = \left(\frac{\lambda}{\lambda - t}\right)' \Bigg|_{t=0} = \frac{1}{\lambda} = E[X]$$

$$\frac{d^2 M_X(t)}{dt^2}\Bigg|_{t=0} = \frac{2}{\lambda^2} = E[X^2]$$

$$\mathrm{Var}[X] = E[X^2] - [E[X]]^2 = \frac{2}{\lambda^2} - \frac{1}{\lambda^2} = \frac{1}{\lambda^2}$$

Estadística de Orden K



x_i = muestra sin alterar

$x_{(i)}$ = muestra ordenada

$$x = \begin{bmatrix} x_1 \\ \vdots \\ x_N \end{bmatrix} \xrightarrow{\text{ordenar ascendente}} \begin{bmatrix} x_{(1)} \\ \vdots \\ x_{(N)} \end{bmatrix} = x_{ord}$$

longitud N

longitud N

x_i no es necesariamente igual a $x_{(i)}$

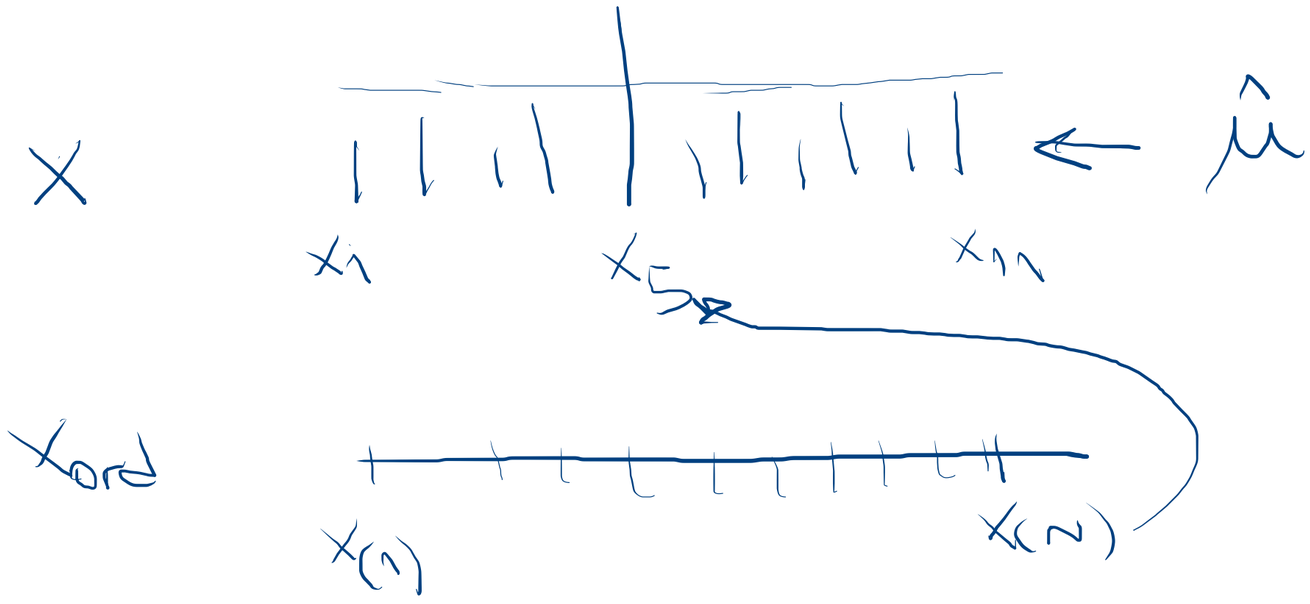
$x_{(1)}$ = mínima de x

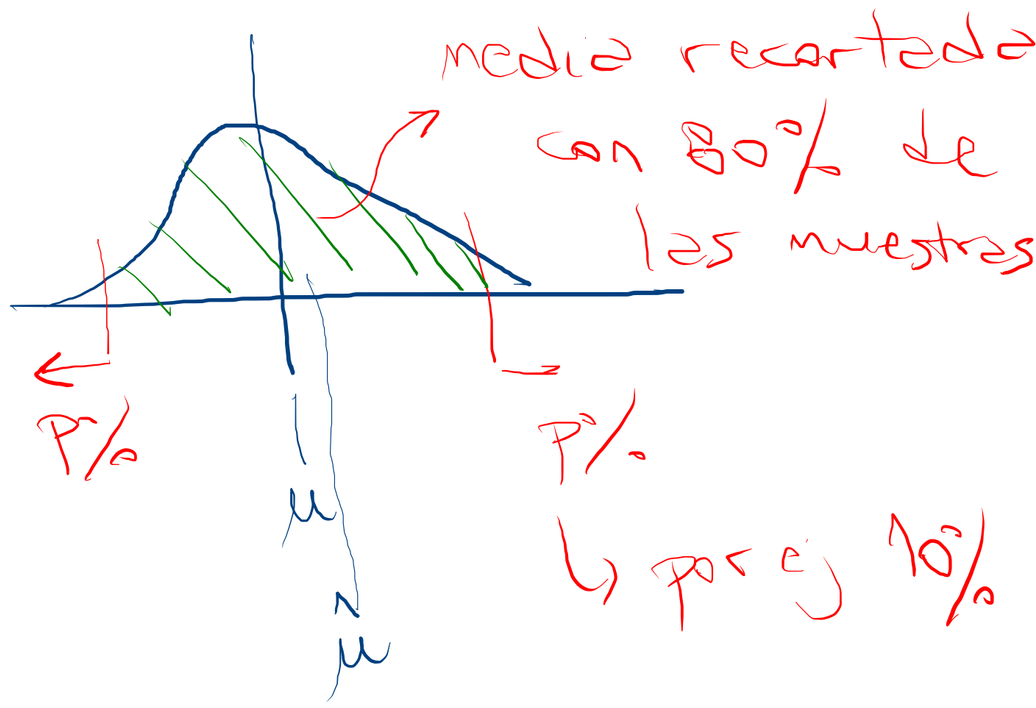
$x_{(N)}$ = máxima de x

Media Muestral y Recortada

$$\hat{\mu} = \frac{1}{N} \sum_{i=1}^{N} x_i$$ ← suma todas las muestras.

$$S^2 = \frac{1}{N-1} \sum_{i=1}^{N} (x_i - \hat{\mu})^2$$



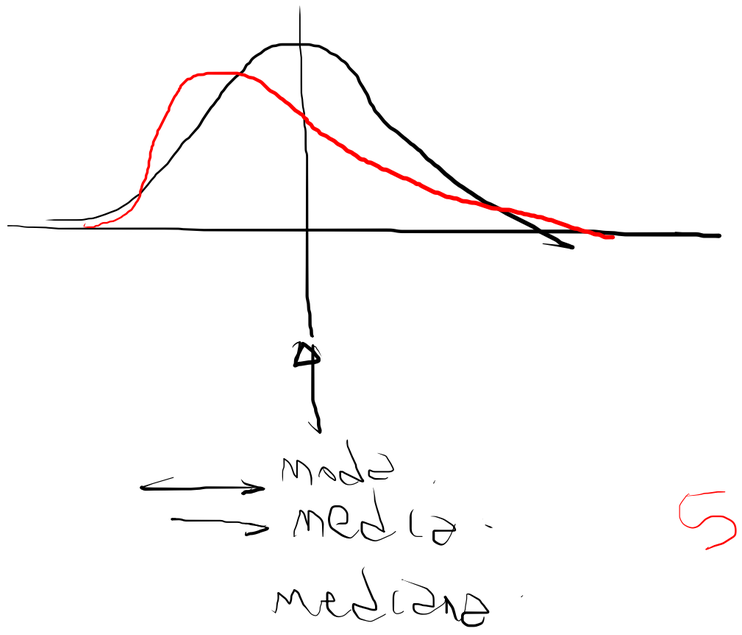


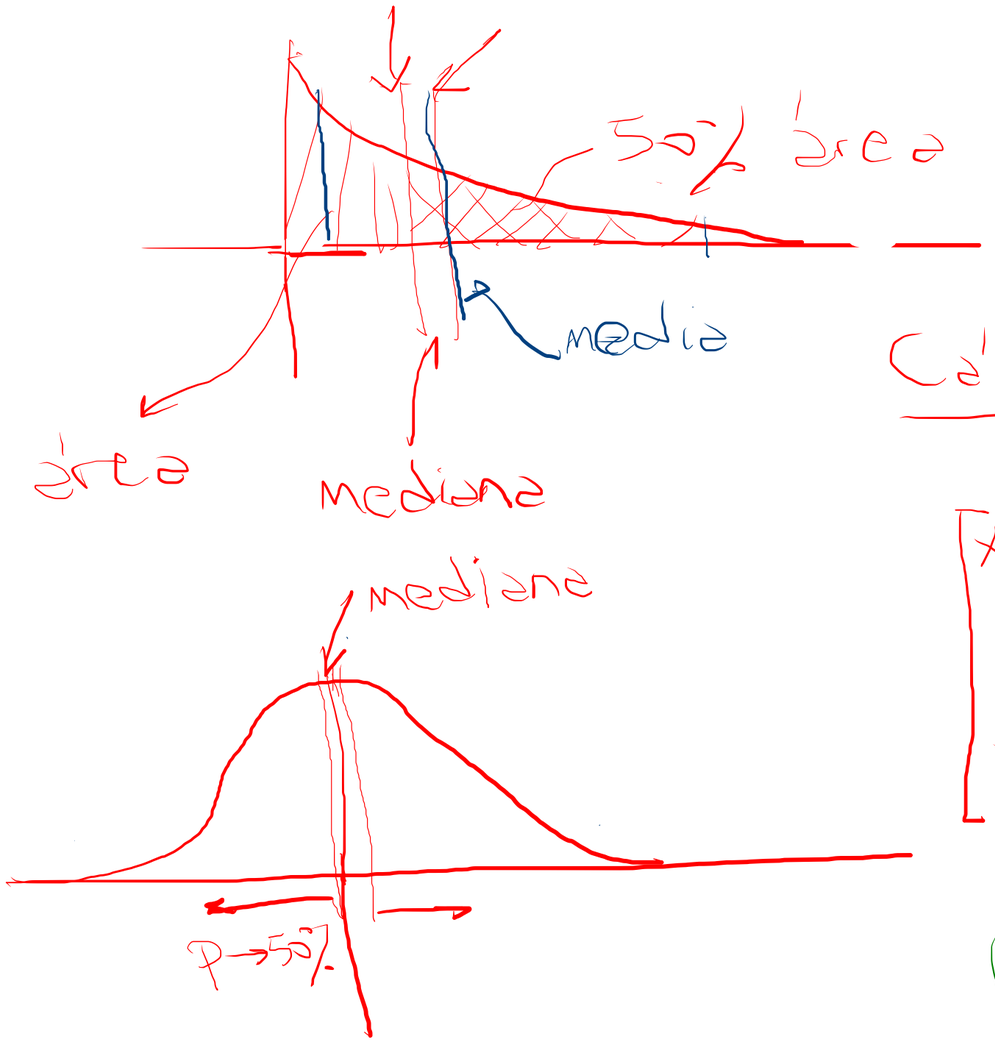
Media recortada $p=0,1$

$N(1,1) \rightarrow n=10000$

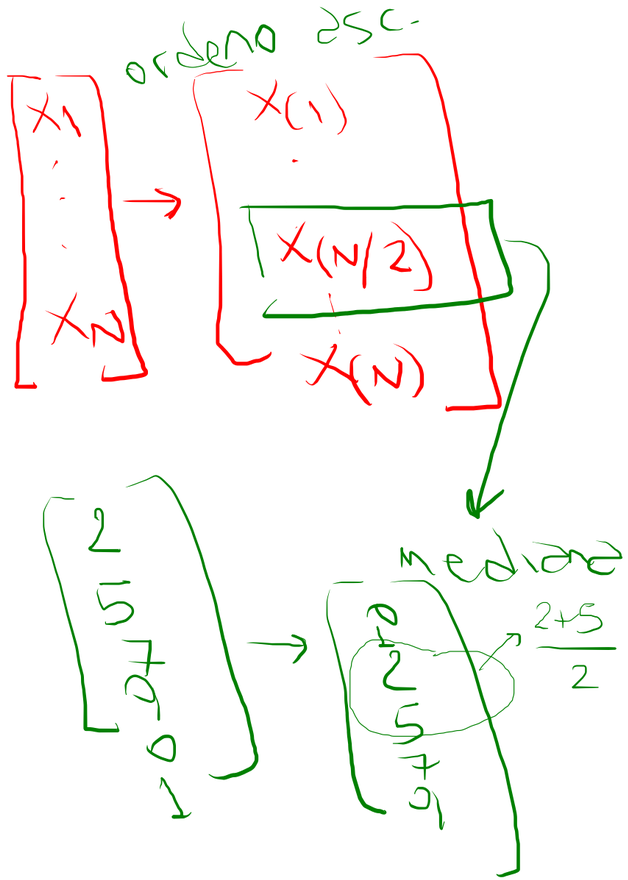
$exp(1)$

Comparar con la media sin recortar

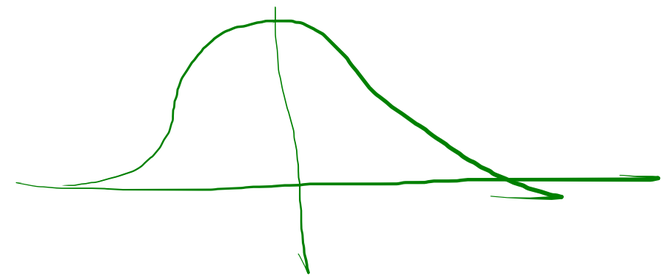


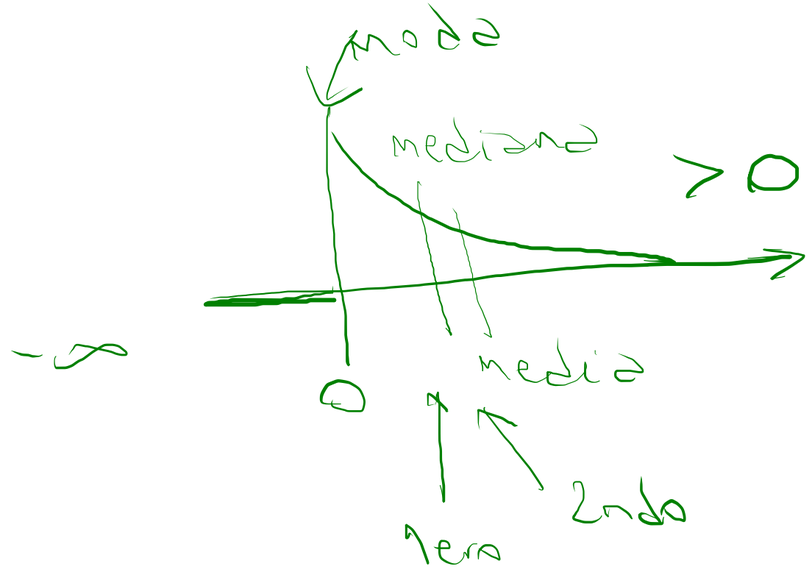


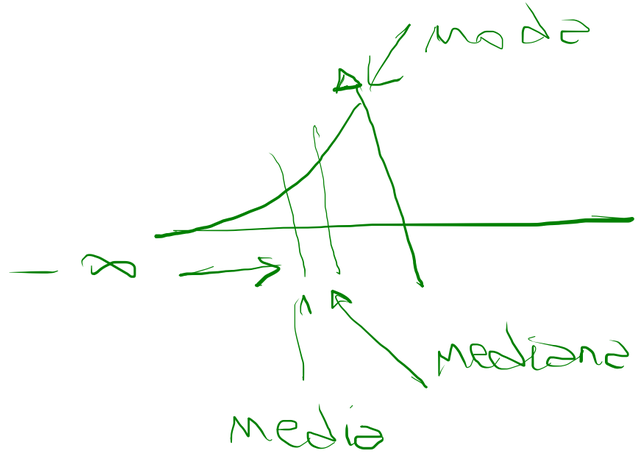
Calculo de mediana



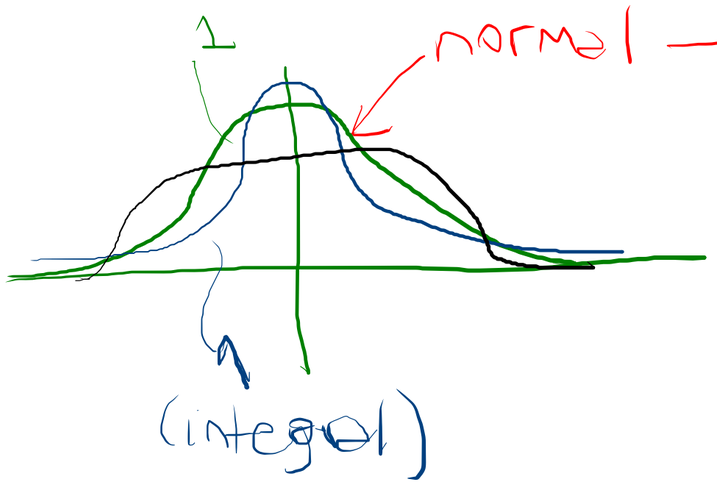
Skewness - Oblicuidad





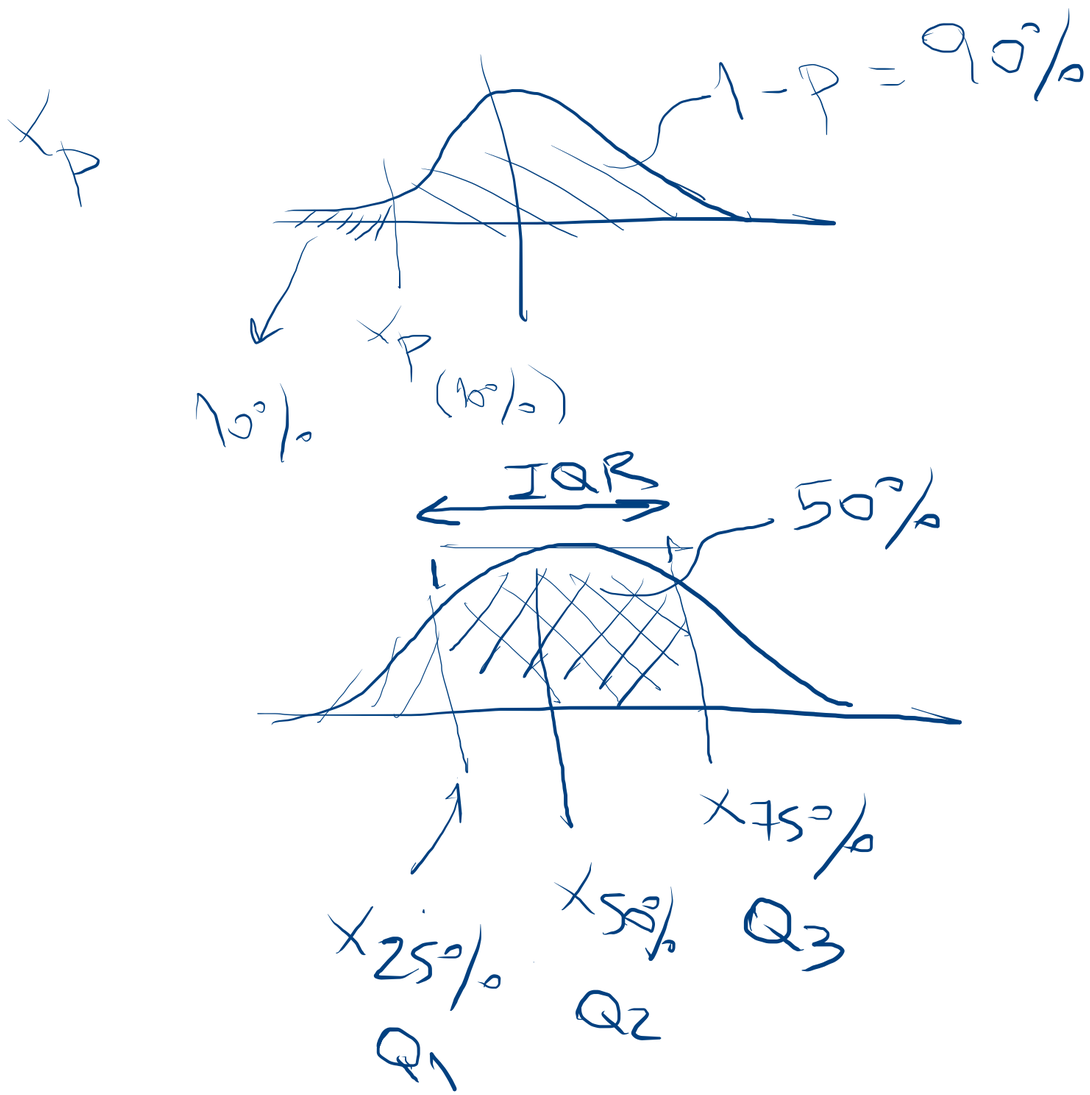


Curtosis



normal → Kurt(normal) = 3

Percentil p

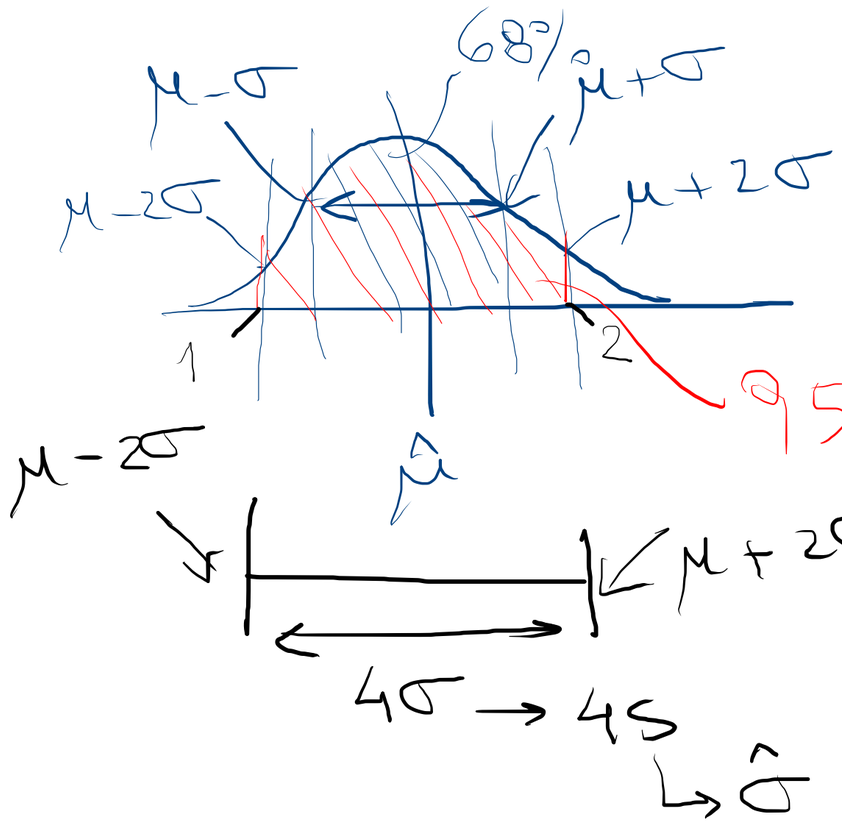


$Q_2 = ? = \text{Mediana}$

Para describir un conjunto de datos:

- Mínimo ($x_{(1)}$)
- Q1
- Q2
- Q3
- Máximo ($x_{(N)}$)

Regla Empírica



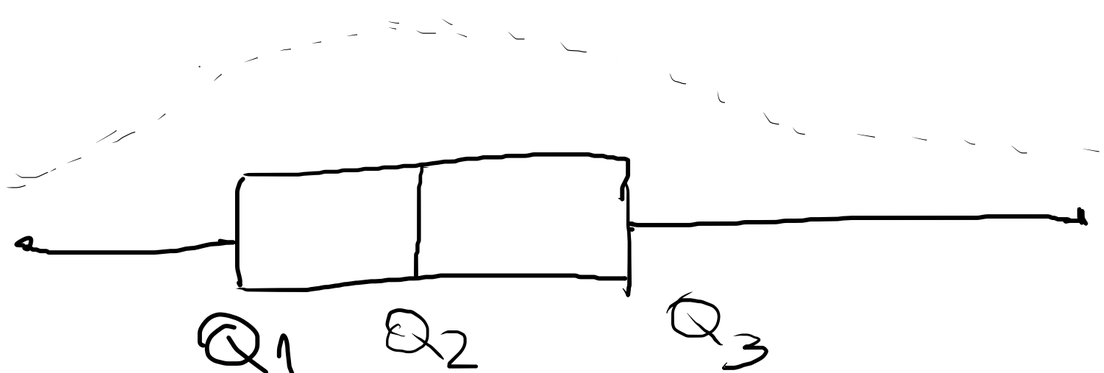
$rg = Máx - Mín$ } recortado 95%

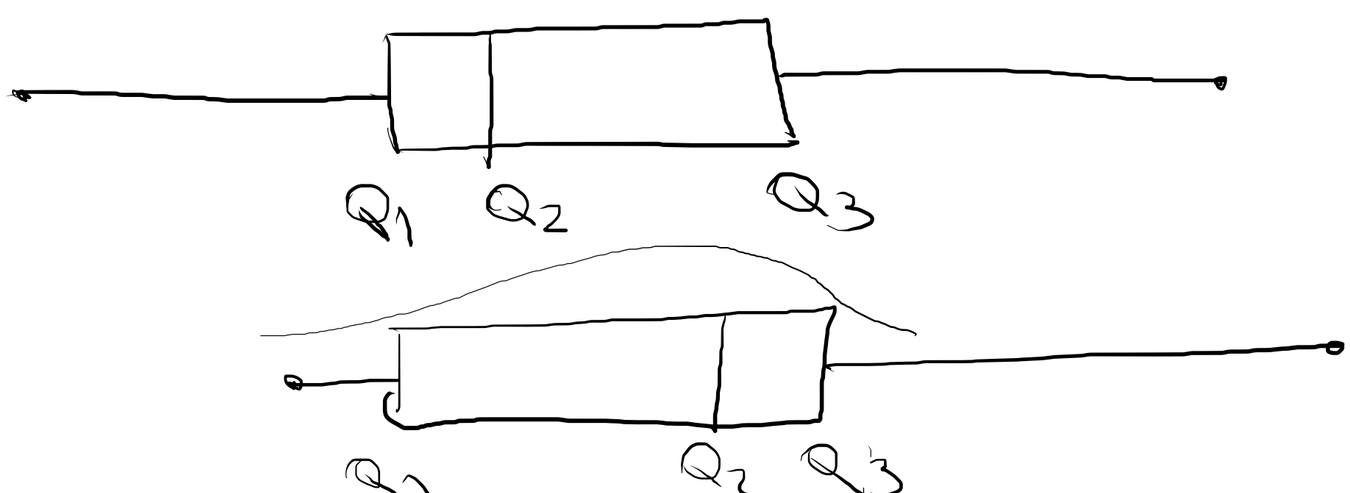
$= 4s$

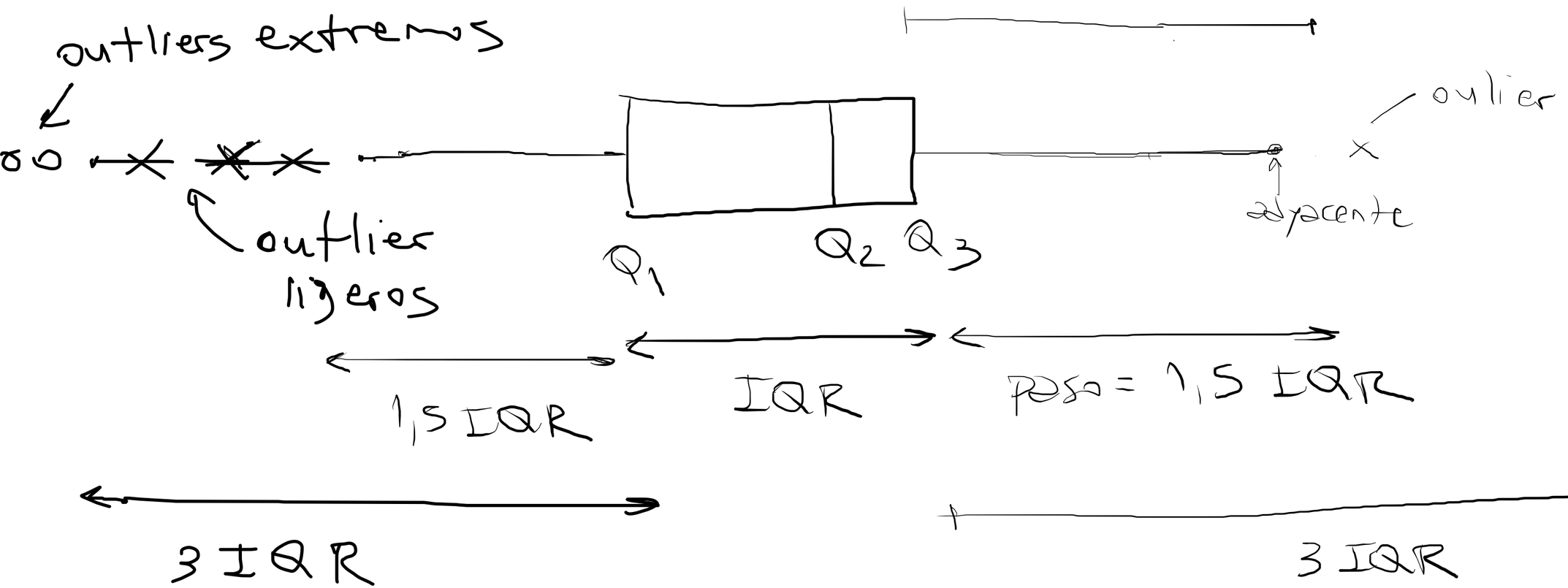
$\hat{s} = \frac{rg}{4}$

Diagrama de Box-and-Whiskers

Q_1, Q_2, Q_3






outliers extremos
outlier ligeros
outlier
adyacente
Q1
Q2 Q3
1,5 IQR
IQR
Peso = 1,5 IQR
3 IQR
3 IQR

Stem and Leaf

$$x = [14 \quad 10 \quad 20]$$

1	40
2	0

tallo (stem)

hoja (leaf)