

# VA-FuncionNoLineal

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## Función de variable aleatoria

El caso  $Y = Y(X) = X^2$

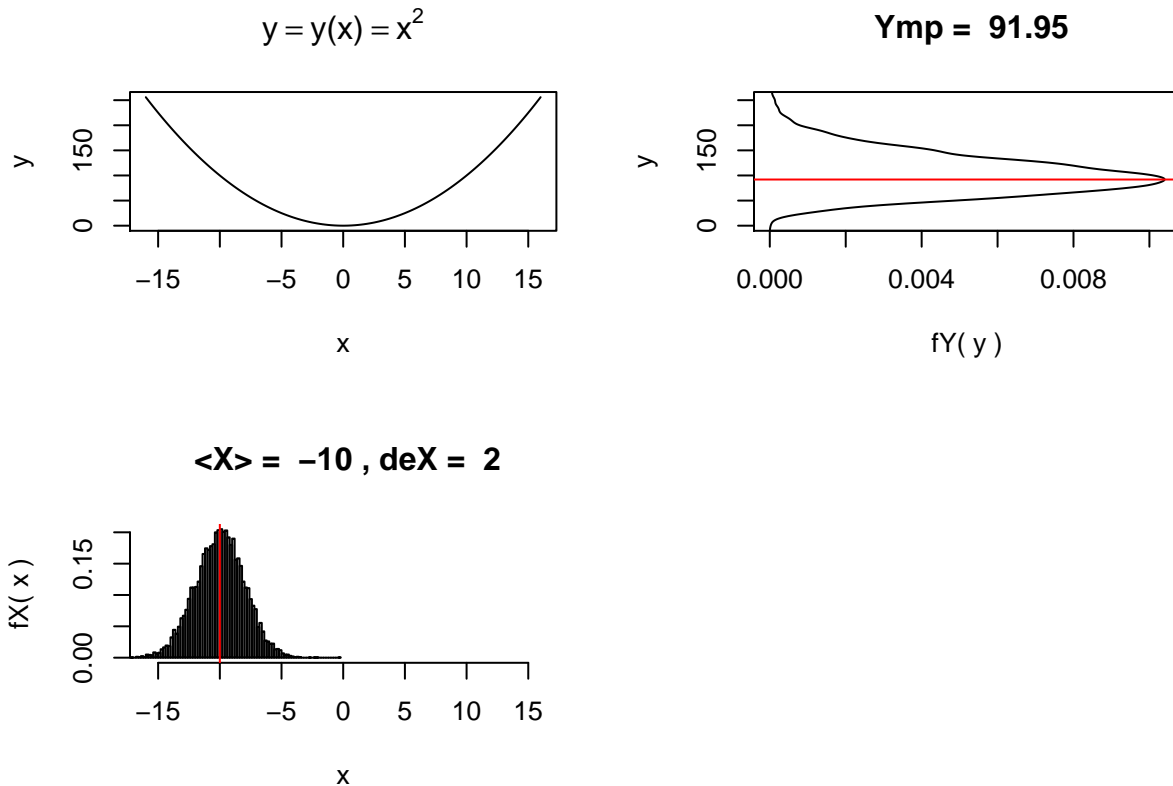
- Sea la variable aleatoria  $X \sim N(\mu_X, \sigma_X)$
- Sea  $Y = Y(X) = X^2$
- ¿Cómo será la función de distribución de  $Y, f_Y(y)$ ?

De acuerdo con el teorema:

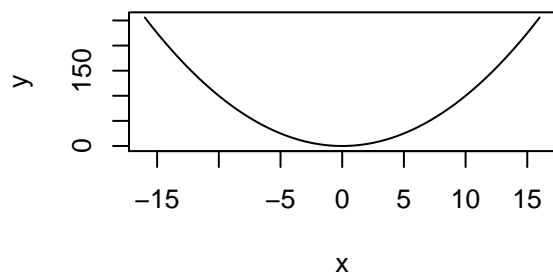
$$f_Y(y) = f_X(x(y)) \left| \frac{dx}{dy}(y) \right|$$

Comprobaremos el teorema de la forma habitual: generando al azar un número grande de valores de la variable normal  $X$  y transformándolos de acuerdo con la función  $Y = Y(X)$ . A continuación haremos el histograma de los valores de  $Y$ .

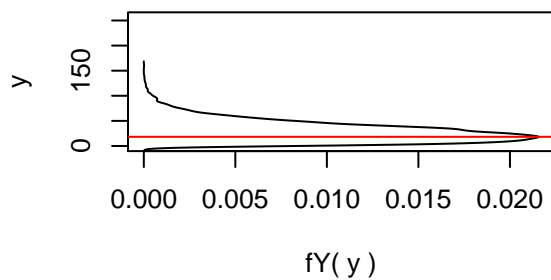
Queremos ver como se modifica  $f_Y(y)$  al variar el parámetro  $\mu_X$



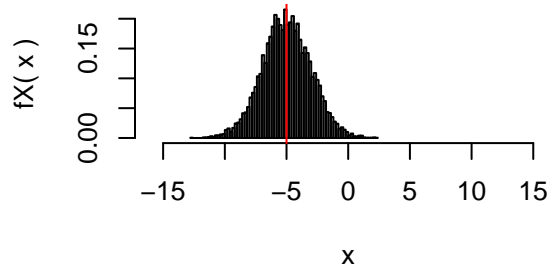
$$y = y(x) = x^2$$



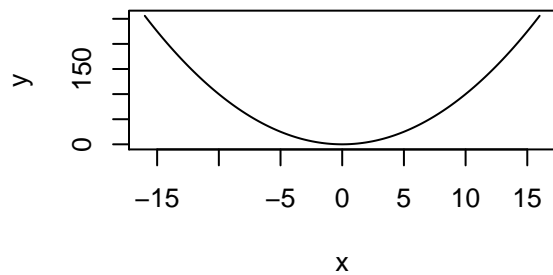
$$Y_{mp} = 18.24$$



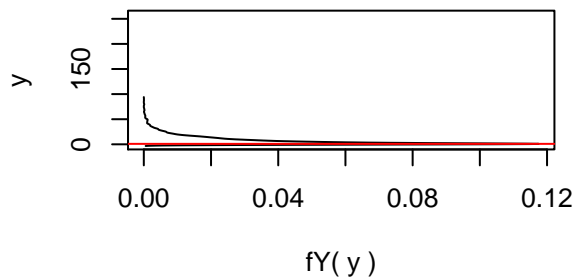
$$\langle X \rangle = -5, \text{ deX} = 2$$



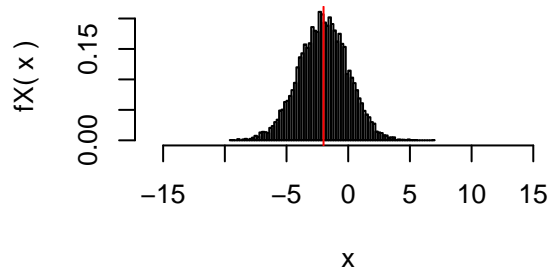
$$y = y(x) = x^2$$



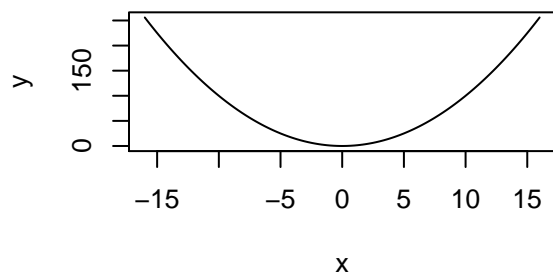
$$Y_{mp} = 0.87$$



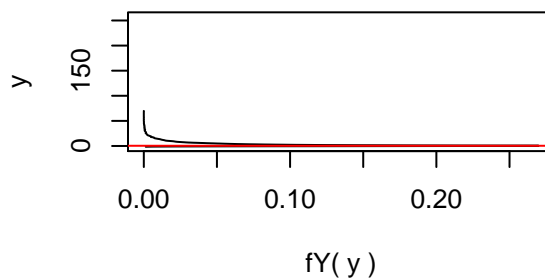
$$\langle X \rangle = -2, \text{ deX} = 2$$



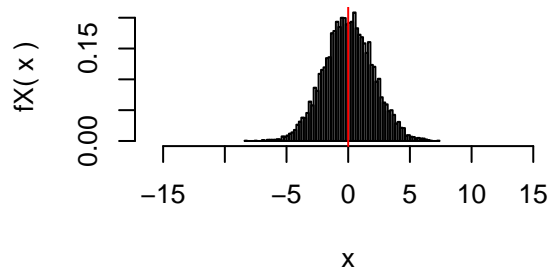
$$y = y(x) = x^2$$



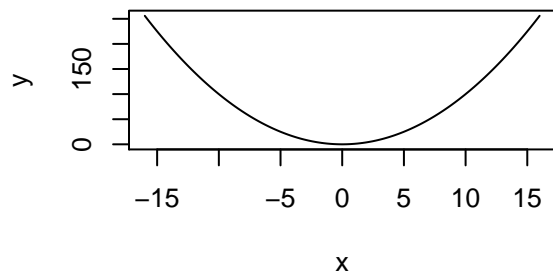
$$Y_{mp} = 0.42$$



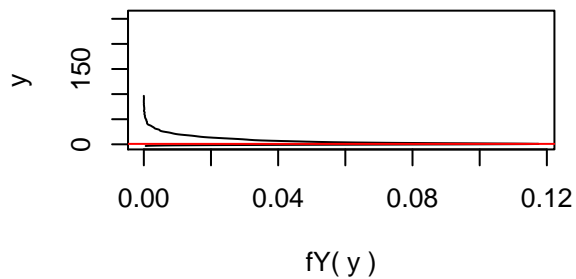
$$\langle X \rangle = 0, \text{ de}X = 2$$



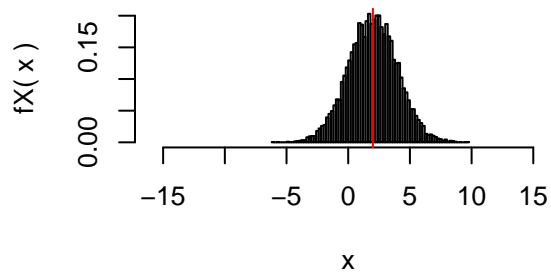
$$y = y(x) = x^2$$



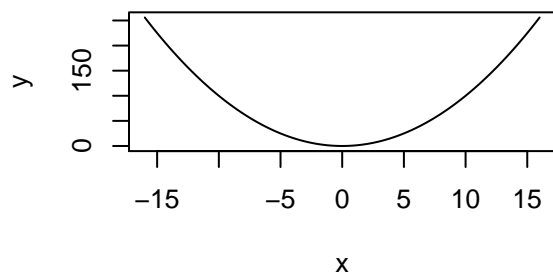
$$Y_{mp} = 0.82$$



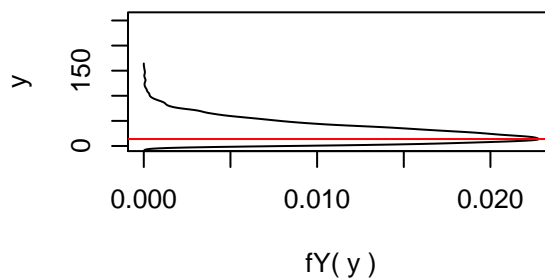
$$\langle X \rangle = 2, \text{ de}X = 2$$



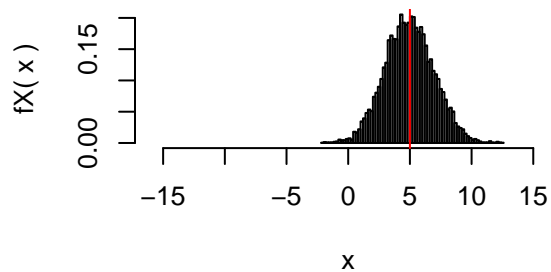
$$y = y(x) = x^2$$



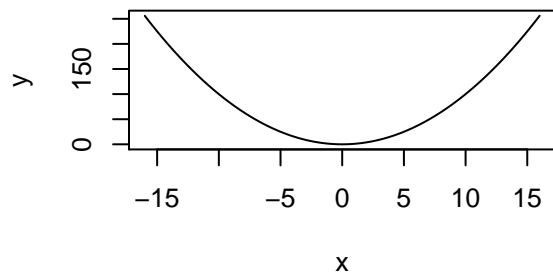
$$Y_{mp} = 13.85$$



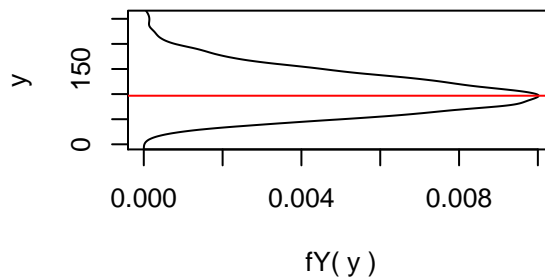
$$\langle X \rangle = 5, \text{ deX} = 2$$



$$y = y(x) = x^2$$



$$Y_{mp} = 96.79$$



$$\langle X \rangle = 10, \text{ deX} = 2$$

