Ejercicio en Clase

x	F(x)
1	0
4	1.386294
5	1.609438
6	1.791752

Evaluar $F(2)$ usando la interpolación lineal, cuadratica y cúbica

Interpolación lineal

$$F(x) = \frac{F(x_1) - F(x_0)}{x_1 - x_0}(x - x_0) + F(x_0)$$

$$F(2) = \frac{1.386294 - 0}{4 - 1}(2 - 1) + 0 = 0.462098$$

Interpolación cuadratica

$$F(x) = F(x_0) + \left(\frac{F(x_1) - F(x_0)}{x_1 - x_0}\right)(x - x_0) + \frac{\left(\frac{F(x_2) - F(x_1)}{x_2 - x_1} - \frac{F(x_1) - F(x_0)}{x_1 - x_0}\right)}{x_2 - x_0}(x - x_0)(x - x_1)$$

$$F(2) = 0 + \left(\frac{1.386294 - 0}{4 - 1}\right)(2 - 1) + \frac{\left(\frac{1.609438 - 1.386294}{5 - 4} - \frac{1.386294 - 0}{4 - 1}\right)}{5 - 1} * (2 - 1)(2 - 4)$$

$$F(2) = 0.462098 + \left(\frac{0.223144 - 0.462098}{5 - 1}\right) * (-2)$$

$$F(2) = 0.581575$$

Interpolación Polinomial

$$F_3(x) = F(x_0) + (x - x_0)\frac{F(x_1) - F(x_0)}{x_1 - x_0} + (x - x_0)(x - x_1)\frac{\frac{F(x_2) - F(x_1)}{x_2 - x_1} - \frac{F(x_1) - F(x_0)}{x_1 - x_0}}{x_2 - x_0}$$

$$+ (x - x_0)(x - x_1)(x - x_2)\frac{\frac{F(x_3) - F(x_2)}{x_3 - x_2} - \frac{F(x_2) - F(x_1)}{x_2 - x_1}}{\frac{-\frac{F(x_1) - F(x_0)}{x_1 - x_0}}{x_3 - x_0}}$$

$$F_3(x) = 0.581575 + (2-1)(2-4)(2-6)\frac{(1.791752 - 1.609438)}{6-6}$$

$$\frac{-(1.609438 - 1.386294)}{6-4}$$

$$\frac{-\frac{1.386294 - 0}{4-1}}{6-1}$$

$$F_3(x) = 0.676616$$