i. Generate the Chebyshev Polynomials up to order 10

Given
$$\left.\begin{aligned} T_0(x) &= 1 \\ T_1(x) &= x \\ T_2(x) &= 2x^2 - 1 \end{aligned}\right\} \quad \boxed{T_{n+1} = 2xT_n - T_{n-1}} \quad \text{General Term}$$

$$T_3 = 2x(2x^2-1) - x$$

$$T_4 = 2x(2x(2x^2-1)-x) - (2x^2-1)$$

$$T_5 = 2x(2x(2x(2x^2-1)-x)) - (2x^2-1)) - (2x(2x^2-1) - x)$$

$$T_6 = 2x[2x(2x(2x(2x^2-1)-x)) - (2x^2-1)) - (2x(2x^2-1)-x)] - (2x(2x(2x^2-1)-x) - (2x^2-$$

$$T_7 = 2x\,T_6 - T_5$$

$$T_8 = 2x\,T_7 - T_6$$

$$T_9 = 2x\,T_8 - T_7$$

$$T_{10} = 2x\,T_9 - T_8$$

ii. Sixth degree Maclaurin Series & Chebyshev Polynomials

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \frac{x^5}{5!} + \frac{x^6}{6!} \quad \& \quad T_6(x) = 32x^6 - 48x^4 + 18x^2 - 1$$

Economize Maclaurin

$$\rightarrow \boxed{1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \frac{x^5}{5!} + \frac{x^6}{6!} - \frac{1}{32} * \frac{1}{6!}\left(32x^6 - 48x^4 + 8x^2 - 1\right)}$$