Exercises

1. Evaluate the following:

   (i) $\left(\frac{\Delta^2}{E}\right)e^x$ (ii) $\frac{Ee^x}{\Delta^2 e^x}$ (iii) $\Delta\left(\frac{2^x}{(x+1)!}\right)$ (iv) $\frac{\Delta^2 x^3}{Ex}$

   (v) $\Delta\sin(2x)$ (vi) $\Delta\log(cx)$ (vii) $\Delta\cot(2^x)$ (viii) $\frac{\Delta}{E}\sin(2x)$

   (ix) $\Delta^3[(1-ax)(1-bx)(1-cx)]$ (x) $\frac{\Delta^2}{E}\sin(x+h)+\frac{\Delta^2\sin(x+h)}{Esin(x+h)}$

2. Find f (1.1) from the following table:

x	1	2	3	4	5
$f(x)$	7	12	29	64	123

3. Given, $u_0 = 1, u_1 = 11, u_2 = 21, u_3 = 29$, find $\Delta^4 u_0$.
4. Prove that $e^{-hD} \equiv 1 - \nabla$

   [Hint: Already proved $\nabla E \equiv \Delta, \text{therefore, } E \equiv 1 + \Delta \equiv 1 + \nabla E, \Longrightarrow E - \nabla E$]

5. Find u_0, given u_0 =-3, $u_1 = 6, u_2 = 8, u_3 = 12$.
6. Given that $u_x$is a polynomial of second degree and u_0 =1, $u_1 + u_2 = 10, u_3 + u_4 + u_5 = 65$. Find the value of u_{10}.