Class 9: Problems on generating functions and Jacobi Series:

1. Prove the following recurrence relation using generating functions:
   $xJ_{n-1}(x) = nJ_n(x) + xJ_n'(x)$

2. Using Jacobi Series prove the following results.

   $(i)\ x\cos(x) = 2\left(J_1 - 3^2 J_3 + 5^2 J_5 - \text{----}\right)$

   $(ii)\ x\sin(x) = 2\left(2^2 J_2 - 4^2 J_4 + 6^2 J_6 - \text{----}\right)$

****