

Class 8: Generating Functions, Jacobi series:

1. Prove the following recurrence relations using generating functions:

$$i) \quad J_{n-1}(x) + J_{n+1}(x) = \frac{2n}{x} J_n(x)$$

$$ii) \quad J'_n(x) = \frac{1}{2} [J_{n-1}(x) + J_{n+1}(x)]$$

2. Using Jacobi Series prove the following results.

$$(i) \quad \cos(x) = J_0 - 2 J_2 + 2 J_4 - + \dots$$

$$(ii) \quad \sin(x) = 2 J_1 - 2 J_3 + - + \dots$$
