clear;

clc;

clf;

*// Define x values*

n = input ("enter")

x=-n:0.1:n

*// Actual exponential function*

f = exp(x);

*// Initialize Taylor series approximation*

taylorSeries = zeros(x);

*// Compute Taylor series up to N terms*

N = 10; *// Number of terms in the expansion*

for n = 0:N

term = (x.^n) ./ factorial(n); *// Calculate the current term*

taylorSeries = taylorSeries + term; *// Add the term to the series*

disp("After adding term n = " + string(n) + ", Taylor series is:");

disp(taylorSeries); *// Display the current state of the series*

end

*// Display the final Taylor series result*

disp("Final Taylor series result:");

disp(taylorSeries);

*// Plot the actual exponential function*

plot(x, f, 'r', 'LineWidth', 2);

*// Overlay the Taylor series approximation on the same plot*

plot(x, taylorSeries, 'b--', 'LineWidth', 2);

*// Add labels, title, and legend*

xlabel("x-axis");

ylabel("y-axis");

title("Exponential Function and its Taylor Series Approximation");

legend(["Exponential Function", "Taylor Series Approximation"]);