Problem Set 2

1. For a European call option on a non-dividend paying stock, show (any way you want) that the solution to the Black-Scholes problem is:

\[
C(S, K, t, T) = SN(d_1) - Ke^{-(T-t)} N(d_2)
\]

- \(N(.)\) is the cumulative normal distribution
- \(d_1 = \frac{\ln(S/K) + (r + \sigma^2/2)(T-t)}{\sigma \sqrt{T-t}}\)
- \(d_2 = d_1 - \sigma \sqrt{T-t}\)

2. Program so as to draw 20 sample paths for a stock following the jump-diffusion model with 1-day intervals for each increment (i.e. \(dt=1/365\)) and a total duration of 1 year. Use a (yearly) jump probability \(\lambda\) of 50% and a mean jump size of -30%. Start with initial stock price of $100. Choose the remaining parameters to your liking, but make sure they are reasonable. You should be able to observe some down jumps on some of the paths. Turn in both your program and the graph as output.