**FINANCE**

1. **Black Scholes Call Price**

**Question**

(Please show your workings). Yara Inc is listed on the NYSE with a stock price of $40 - the company is not known to pay dividends. We need to price a call option with a strike of $45 maturing in 4 months. The continuously-compounded risk-free rate is 3%/year, the mean return on the

stock is 7%/year, and the standard deviation of the stock return is 40%/year. What is the Black-Scholes call price?

C = Call price

S = Stock price

E = Exercise price

r = Risk free interest rate

T = Time to maturity

Σ = Standard deviation

C = SNx1 - Ee-rTNx2

S = $40

E = $45

r = 3% = 3/100 = 0.03

T = 4 months = 4/12 = ⅓

Σ = 40% = 40/100 = 0.4

C = 40Nx1 - 45e-0.03(⅓)Nx2

x1 = (In(40/45) + (r + (0.42/2))(⅓)) / (0.4√(⅓))

X1 = (-0.1178 + (0.03 + 0.08)(⅓)) / (0.4√(⅓))

X1 = (-0.1178 +0.11(⅓)) / (0.4 \* 0.57735)

X1 = (-0.1178 + 0.03667) / (0.23094)

X1 = (-0.08113) / (0.23094)

X1 = -0.35130

X2 = X1 - 0.4√(⅓)

X2 = -0.35130 - 0.4√(⅓)

X2 = -0.58224

C = 40 \* N \* -0.35130 - 45e-0.03(⅓) \* N \* -0.58224

C = 40 \*

C = 40 \* 0.3627 - 44.55224 \* 0.2802

C = 2.02446

The BlACK Scholes Call Price is 2.02446