

$S = 40$ (current stock Price)

$K = 45$ (strike price of the call)

r = annual continuously compounded risk free interest rate

σ = stock's volatility

$N(x)$

T = time to maturity of the call

$$B = K \cdot e^{-rT}$$

\therefore

$$S = \$40, \quad B = 45 e^{(-0.03(1/3))} = \underline{44.55224}$$

Note that $1/3$ is the time to maturity $4\frac{1}{12}$ months

$$\begin{aligned} \Rightarrow x_1 &= \frac{\log(S/B)}{\sigma\sqrt{T}} + \frac{1}{2}\sigma\sqrt{T} \\ &= \frac{\log(40/44.55224)}{0.4\sqrt{1/3}} + \frac{1}{2}(0.4(\sqrt{1/3})) \\ &= -0.3512442 \end{aligned}$$

$$\begin{aligned} \Rightarrow x_2 &= \frac{\log(S/B)}{\sigma\sqrt{T}} - \frac{1}{2}\sigma\sqrt{T} \\ &= -0.5821843 \end{aligned}$$

$$\therefore N(x_1) = 0.3627026, \quad N(x_2) = 0.2802213$$

\therefore Black-scholes call price, c

$$\Rightarrow c = S(N(x_1)) - B(N(x_2))$$

$$= 40 \times 0.3627026 - 44.55224 \times 0.2802213$$

$$\approx \underline{\underline{\$2.023617}}$$