Black Scholes Call Price.

Using the Black Scholes formula

$$C_0 = S_0 N(d_1) - Xe^{-rT} N(d_2)$$

Given the information

S_0 = stock price = \$40

X = Strike price = \$45

T = time of expiration = 4 months = $\frac{4}{12}$ = 0.33 yrs

r = risk of free interest rate = 3% = $\frac{3}{100}$ = 0.03

σ = standard deviation of log returns (i.e volatility) = 40% = $\frac{40}{100}$ = 0.4

Where;

$$d_1 = \frac{\ln\left(\frac{S_0}{X}\right) + \left(r + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}$$

$$d_1 = \frac{\ln\left(\frac{40}{45}\right) + \left(0.03 + \frac{(0.4)^2}{2}\right)0.33}{0.4\sqrt{0.33}}$$

$$d_1 = \frac{-0.1178 + 0.0363}{0.2298}$$

$$d_1 = -0.3547$$

$$d_1 \simeq -0.35$$

Also,

$$d_2 = d_1 - \sigma\sqrt{T}$$

$$d_2 = -0.3547 - 0.2298$$

$$d_2 = -0.5845$$

$$d_2 \simeq -0.58$$

Because d_1 and d_2 are negative, we use

$N(d_1) = 1 - N(-d_1)$ and $N(d_2) = 1 - N(-d_2)$

Looking up the standard normal distribution table.

$d_1 = 0.35$ $d_2 = 0.58$

Respect

From the table.

$d_1 = 0.6368$

$d_2 = 0.7190$

Therefore

$N(d_1) = 1 - 0.6368$

$N(d_1) = 0.3632$

Also,

$N(d_2) = 1 - 0.7190$

$N(d_2) = 0.281$

Using these values in our Black-Scholes formula, we have;

$$C_0 = \$40\,(0.3632) - \$45\left(e^{-0.03(0.33)} \times 0.281\right)$$

$$C_0 = \$40\,(0.3632) - \$45\,(0.9901 \times 0.281)$$

$$C_0 = \$14.528 - \$45\,(0.2782)$$

$$C_0 = \$14.528 - \$12.520$$

$$C_0 = \$2.008$$

Therefore, the Black Scholes call price is $\boxed{\$2.008}$