$C = P_aN(d_1) – P_eN(d_2)e^{-rt}$

$$d_1 = \frac{Ln\left(\frac{Pa}{Pe}\right)+r+0.5\sigma^2)t}{\sigma\sqrt{t}}$$

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

$P_a = \$40$

$P_e = \$45$

$r = 3\%$

$\sigma = 40\%$

$t = 4$ months $= 0.333$ years

$$d_1 = \frac{Ln\left(\frac{40}{45}\right)+(0.03+0.5(0.4)^2)0.333}{0.4\sqrt{0.333}}$$

$$d_1 = \frac{-0.118+0.03663}{0.2308}$$

$$d_1 = \frac{-0.08137}{0.2308}$$

$d_1 = -0.35$

$d_2 = -0.35 – 0.2308$

$d_2 = -0.58$

$C = 40(N)(-0.35) – 45(N)(-0.58)e^{-0.03(0.333)}$

$C = 40(0.363) – 45(0.281)e^{-0.0099}$

$C = 14.52 – 45(0.281)0.990$

$C = 14.52 – 12.52$

$C = \$2$

The Black-Scholes call option price is $2