

74. We use the expression for the flux Φ_B over the toroid cross-section derived in our solution to problem 52 obtain the coil-toroid mutual inductance:

$$M_{ct} = \frac{N_c \Phi_{ct}}{i_t} = \frac{N_c}{i_t} \frac{\mu_0 i_t N_t h}{2\pi} \ln\left(\frac{b}{a}\right) = \frac{\mu_0 N_1 N_2 h}{2\pi} \ln\left(\frac{b}{a}\right)$$

where $N_t = N_1$ and $N_c = N_2$. We note that the formula for Φ_B can also be found in the Supplement for the chapter, in Sample Problem 31-11.