Fall 3:

$$COF^{-1} = \left[\frac{N}{k}\left(1-\exp(-\Delta 4\, k)\right) + \frac{1}{2}\right]^{-1}$$

$$\Rightarrow \quad q = \frac{N}{k}\left(1-\exp(-\Delta 4 k)\right) + \frac{1}{2}$$

$$\Leftrightarrow \frac{k}{N}\left(q-\frac{1}{2}\right) = 1-\exp(-\Delta 4 k) \Leftrightarrow \exp(-\Delta 4 k) = 1-\frac{k}{N}\left(q-\frac{1}{2}\right)$$

$$\Leftrightarrow -\frac{1}{k}\ln\left(1-\frac{k}{N}\left(q-\frac{1}{2}\right)\right) = \Delta 4$$