$C(t) = 5(8)^t$

$80 = 5(8)^t$

$16 = 8^t$

$\log_{base\,8}(16) = t$

$t \approx 1.333$

$C(t) = 5(0.5)^t$

$0.3\,C_0 = 8(0.5)^t$

$0.06\,C_0 = (0.5)^t$

$\ln(0.06\,C_0) = \ln((0.5)^t)$

$\ln(0.06\,C_0) = t * \ln(0.5)$

$t = \ln(0.06\,C_0) / \ln(0.5)$

$C_0 = 5\ mg/L$

$t = \ln(0.06*5) / \ln(0.5)$

≈ 5.199

$C_0 = 9\ mg/L$

$r = 0.041/hr$

$t = 7$

$C(7) = 9^t e^{(-0.041 * 7)}$

$C(7) = 9 * e^{(-0.287)} \approx 9 * 0.749$

≈ 0.8

$C_0 = 10\ mg/L$

$C(9) = 3\ mg/L$

$C(9) = C_0 e^{(-9r)}$

$3 = 10 e^{(-9r)}$

$0.3 = e^{(-9r)}$

$\ln(0.3) = -9r$

$r = \ln(0.3)/9$

≈ -0.133

$C(t) = C_0 e^{(-rt)}$

decreases by 80%: $C(b) = 0.2\,C_0$

$0.2\,C_0 = C_0 e^{(-rt)}$

$0.2 = e^{(rt)}$

$\ln(0.2) = \ln(e^{(-rt)})$

$\ln(0.2) = -rt$

$t = \ln(0.2) / -r$

$t = \ln(0.2) / -(0.09)$

$t \approx -2.3026 / -0.09 \approx 25.58$

$\ln 0.8 = -0.09t$