Yet Another Practice Sheet 4

This one is a bit different; it’s a formula sheet for exponential decay and logistic growth.

**Exponential Decay**

Diffeq: \[
\frac{dq}{dt} = -kq
\]

Solution: \[
q(t) = q(0)e^{-kt}
\]

1) What does \(q(0)\) mean?
2) What are the units for \(k\)?
3) \(1/k, \ln 2/k\) are quantities we discussed in class. What are they called?

**Logistic Growth**

Diffeq: \[
\frac{dP}{dt} = rP \left(1 - \frac{P}{K}\right)
\]

Solution: \[
P(t) = \frac{K}{1 + Ce^{-kt}} \quad C = \frac{K - P(0)}{P(0)}
\]

1) What does \(P(0)\) mean?
2) What does \(r\) mean?
3) What is \(K\) called?