

Math Sheet

Name _____ Score _____ Teacher _____ Date _____

First-Order Linear and Logistic Equations

For linear equations, show the integrating factor. For logistic equations, give the solution formula, equilibria, units, and long-term behavior.

1. Let $P(t)$ be a population in organisms, with t in years. Solve $P' = 1/2P(1-P/180)$, $P(0) = 30$; state both equilibria and long-term behavior.

2. A population $P(t)$, measured in organisms with t in years, follows $P' = 1/4P(1-P/180)$ and $P(0) = 90$. Find $P(t)$, both equilibria, and the long-term population.

First-Order Linear and Logistic Equations

For linear equations, show the integrating factor. For logistic equations, give the solution formula, equilibria, units, and long-term behavior.

3. A concentration $C(t)$, in mg/L, satisfies $C' + 3C = 12$, $C(0) = 7$. Find the concentration and its long-term value.

4. Solve $y' + 3y = 9$, $y(1) = 5$. Use an integrating factor and state the maximal interval.