

$$\frac{dP}{dt} = .001 P (100 - P)$$

$$\frac{dP}{dt} = \frac{1}{100} P (100 - P)$$

$$P = \frac{100}{1 + A e^{-.1t}}$$

General Form of
a DE that results
in a logistic function

If

$$\frac{dP}{dt} = \frac{k}{m} P (m - P)$$

Then

$$P = \frac{m}{1 + A e^{-kt}}$$

$$\frac{dP}{dt} = .04P - .0004P^2$$

$$= P(.04 - .0004P) \quad \frac{dP}{dt} = \frac{k}{m} P(m - P)$$

$$= .0004P(100 - P)$$

$$= \frac{.04}{100} P(100 - P)$$

$$P(t) = \frac{100}{1 + Ae^{-.04t}}$$