c) $\frac{dw}{ds} = w$

think of $\frac{dw}{ds} = kw$, with $k = 1$

general solution: $w(s) = Ce^{(1)s}$

$w(0) = \pi$

$\therefore \quad \pi = Ce^{(0)} = C \cdot 1$

solution: $w(s) = \pi e^{s}$

(#9) a) if population growth is proportional to the population,

$\frac{dP}{dt} = kP$, where P = population

when $P = 5000$, $\frac{dP}{dt}$ (which is growth rate) $= 250 \frac{mos}{wk}$

$\frac{dP}{dt} = 250 \frac{\text{mosquitos}}{\text{week}} = k(5000 \text{ mosquitos})$

$k = \frac{250}{5000} = 0.05$

$\therefore \frac{dP}{dt} = 0.05P$

b) $\frac{dB}{dt} = kB$; we want k

solution to diff. eq. $B(t) = Ce^{kt}$

we know: $B(0) = 600$ and $B(10) = 800$

$B(0) = 600$

$600 = Ce^{0 \cdot k} = C \cdot 1$

$\therefore C = 600$

$B(10) = 800$

$800 = 600e^{k(10)}$

$\frac{800}{600} = e^{10k}$