

1) PERFORM BASIC OPERATIONS

$$\frac{d}{dt} e^{-kt} = -ke^{-kt}$$

$$\frac{d}{dt} \frac{1}{kt} = -\frac{1}{kt^2}$$

$$\frac{d}{dt} \ln(kt) = \frac{k}{kt} = \frac{1}{t}$$

$$\int e^{-kt} dt = -\frac{1}{k} e^{-kt} + C$$

check:  $\frac{d}{dt} (e^{-kt}) = -k e^{-kt}$

$$\int \frac{dt}{kt} = \frac{1}{k} \ln(kt) + C$$

check:  $\frac{d}{dt} \ln(kt) = \frac{1}{t}$

$$\int \ln(t) dt = t \ln(t) - t + C$$

CRC # 299

check:  $\frac{d}{dt} [t \ln(t) - t] = \ln(t) + \frac{t}{t} - 1 = \ln(t)$

$$\int \frac{dt}{1+kt} = \frac{1}{k} \ln(1+kt) + C$$

check:  $\frac{d}{dt} \ln(1+kt) = \frac{k}{1+kt}$

$$\int \frac{t dt}{1+kt} = \frac{t}{k} - \frac{1}{k^2} \ln(1+kt)$$

CRC # 30

check:  $\frac{d}{dt} \left[ \frac{t}{k} - \frac{1}{k^2} \ln(1+kt) \right] = \frac{1}{k} - \frac{1}{k^2} \left[ \frac{k}{1+kt} \right] = \frac{t}{1+kt}$

$$\frac{1}{k} \left[ 1 - \frac{1}{1+kt} \right] = \frac{1}{k} \left[ \frac{1+kt-1}{1+kt} \right] = \frac{1}{k} \left[ \frac{kt}{1+kt} \right]$$

$$\int \frac{t dt}{1+kt^2} = \frac{1}{2k} \ln(1+kt^2) + C$$

check:  $\frac{d}{dt} \ln(1+kt^2) = \frac{2kt}{1+kt^2}$