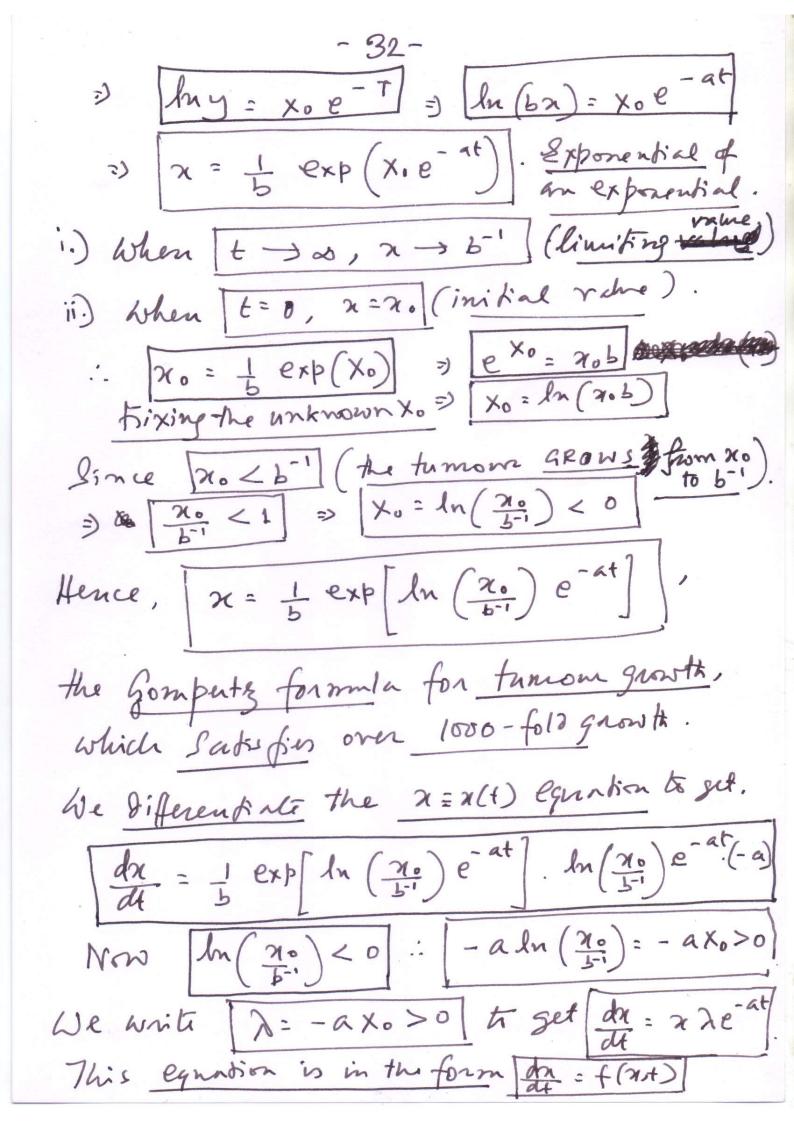
The Dynamis of Free-Living Dividing Ce4

(x= x(t) -> Volume of Dividing cells at time t. The growth rate eguntion is  $\frac{dx}{dt} = \lambda x$  ( $\lambda > 0$ ).

At t = to,  $\lambda = \lambda 0$  Initial Condition. x(t) = 70. exp[x(t-to)]. Cell doubling happens when [x:220]=> Doubling time (6-60: 1/2) Somperty Law of Tumown Growth  $\frac{dx}{dt} = f(x) = -ax \ln(bx) \qquad a, b > 0.$  $\frac{\chi(t) \rightarrow Number of cells in a furnom.}{\text{Rescabing:}} \frac{\zeta_{ale}}{J = \frac{\chi}{b^{-1}}} \frac{\chi(t)}{J} = -\left(\frac{\chi}{b^{-1}}\right) \ln\left(\frac{\chi}{b^{-1}}\right) = \frac{dy}{dT} = -y \ln y$ Integral Schrison: Substitute y=ex = x=lny  $\frac{dy}{dt} = e^{x} \frac{dx}{dt} = y \frac{dx}{dt} = -y \frac{dy}{dt} = -y \frac{dy}{dt}$ => dx =-x. Xo in the > ydx = -xx =) X = X 0 e T intigration
Constant => \[ \left[ \frac{d \times - \int d \tau \]}{\times }



The non-auto no mons form at : f(x,t). Can be server in two ways. They are:

i) du = (reat) x = rat) x = rate on t. ii) or dx = > (xe-xt) -> x is a constant First Form: dx = \(\bar{\chi}(t) \times \((Rati \times State)\) The time scale for tumour generation is t ~ 1 (On comparing with te-to = ln2 in)
free-lining and dividing cells => [t ~ \frac{1}{2} eat] => As t increases, longer time is taken for the Same amount of gworth. The cells matme and divide more slowly Second tom: | dx = \( \( \chi e^{-at} \) . \( \lambda is constant \) and now date in proportional to a state, me ne at This effective State, contributing to the growth of the themore, decreases due to necrosis at the Core of the tumour, with lower number of living cells. First term: Growth process slows Jown [summary]

Second form: Number of cells in the growth is lower.