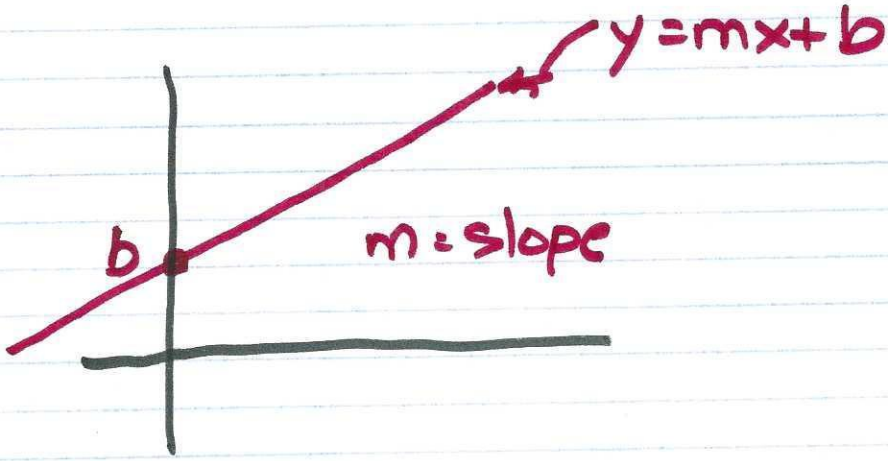
8-29

Exam #1 on Tues Sep 3 !

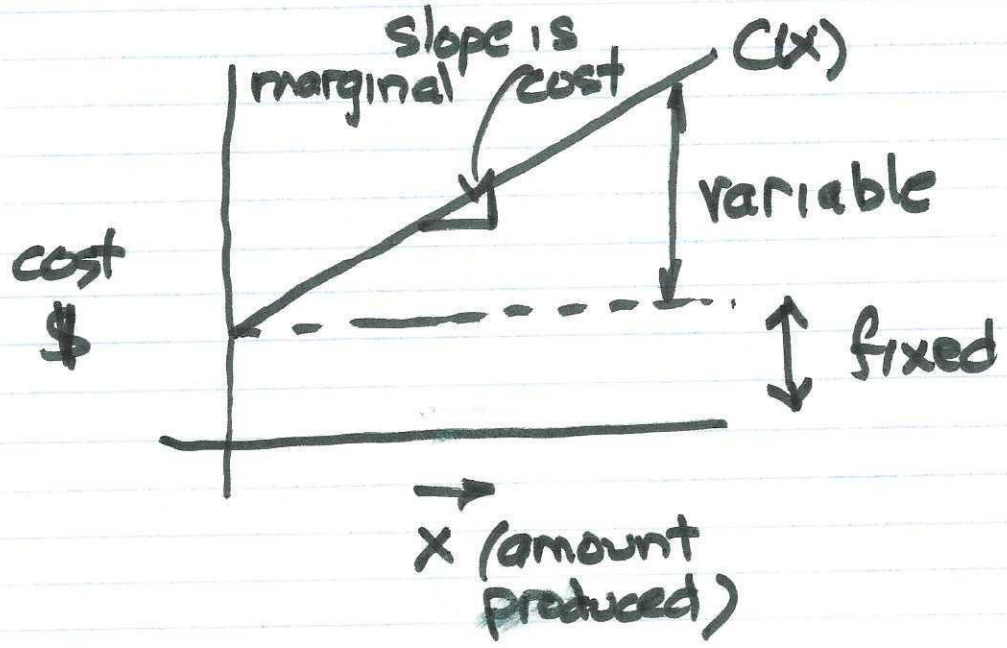
Review:

1) Linear Equations:

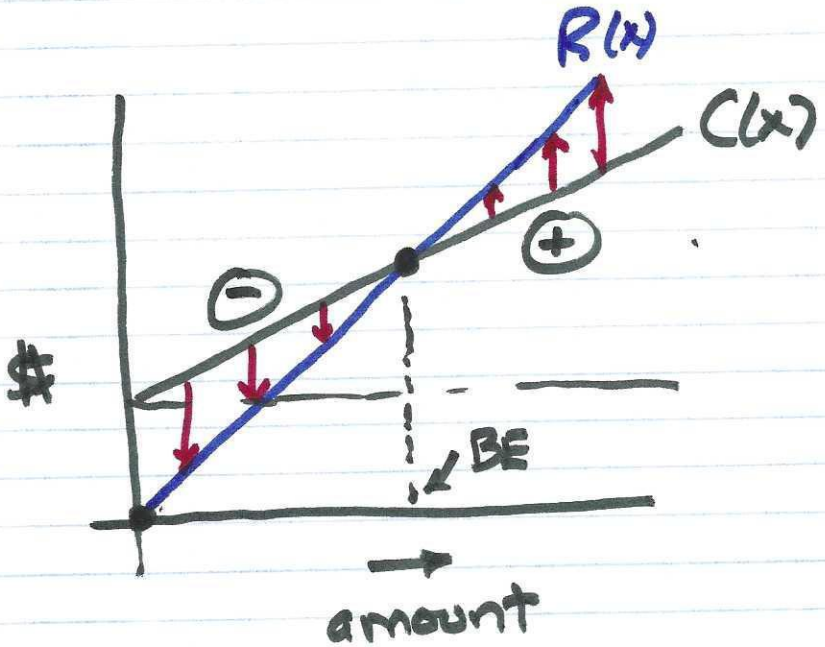
$y = mx + b$



Typical scenario:



(2)



If $C(x) = 10{,}000 + 15x$

$R(x) = 20x$

$10{,}000 + 15x = 20x$

$10{,}000 = 5x$

$2{,}000 = x$ Break Even

$f(x) = b^x \qquad b \neq 1,\ b \neq 0 \qquad b > 0$

$b = 10$
$x = 3 \qquad f(x) = ? \qquad 10^3 = 1000$

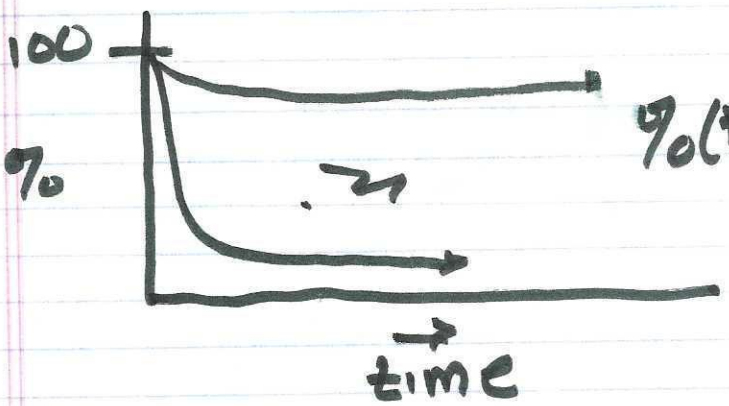
$(\sqrt{2})^5 \quad \sqrt{2}\sqrt{2}\sqrt{2}\sqrt{2}\sqrt{2} \quad = 4\sqrt{2}$
(2 2)

$P(t) = P_0 e^{rt} \qquad P_0 = P(0)$

$L(x) = L_0 e^{-rx}$

$Q(t) = Q_0 e^{-\lambda t} \qquad \lambda$ Greek l

$\lambda = .01$
$\frac{1}{2} = 1e^{-.01(t)} \qquad t_{1/2}$



$\%_0(t) = 100(1 - e^{rt})$

$2^{64-1} \approx 9.223 \times 10^{18}$

$A(t) = Pe^{rt}$ r in fraction (not %)
t in years

$2 = 1 \cdot e^{rt}$ $\ln e^x = x$

$.69315 = rt$

$69.3 = r(\text{in } \%) \cdot t(\text{in yrs})$

Doubling Formula w/ Continuous Compounding

$A = P\left(1+\frac{r}{n}\right)^{m}$ n = # of periods per year
r : annual rate
m : # periods/yr

$= P\left(1+\frac{r}{n}\right)^{nt}$

$A = 1000\left(1+\frac{.08}{4}\right)^{4t}$ r = 8% comp. quarterly

(5)

100 bacteria in petri dish
they grow @ 2%/hr.

How much after 1 week?

$P(t) = 100e^{(.02)168}$

$= 100e^{3.36} = (28.8)(100) = 2880$

$\lambda = .00012$

$Q(t) = Q_0 e^{-.00012t}$

$Q(1000) = Q_0 e^{-.00012t}$

$\frac{Q(1000)}{Q_0} = e^{-.00012t} = e^{-.12} = 88.6$

$t_{1/2} = 5776$ yrs.

$\log 2 = .30103 \Rightarrow 10^{.30103} \sim 2$

$\ln 2 = .69315 \Rightarrow e^{.69315} \sim 2$

$e \sim (2.71828)$

$\log 2 = .30103$
$\log 3 = .47712$

$\log 12$?

$.60206$
$.47712$
1.07918

$b^x = b^y \hookrightarrow x = y$

$\ln \sqrt{3} = \frac{2}{3}$

$e^{\ln x} = x$

$\ln(e^x) = x$

$10^{x+3} = 100^{x+5}$

$(10^2)^{x+5} = 10^{2x+10}$

$x+3 = 2x+10$

$-7 = x$