10-12-05 ①

⇒ HW Ch 5/6 til ~~10~~ 1 PM Fri

- Ch 5/Ch 6 Reading Q til Sun

- Ch 6 on Template = last 2 pages

Test Next Fri

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p 120.

Verbal ⟼ Formula.

Suppose sales of doughnuts increased at an early ~~%~~ growth rate of 20% & seem to leveling off at 15,000/day.

<u>Write</u> a logistic model.

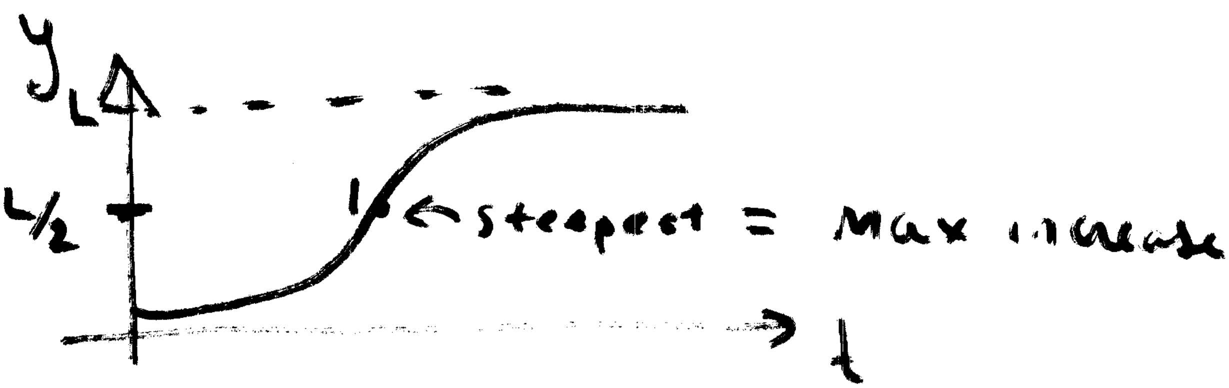
$$\frac{\Delta y}{\Delta t} = .2\, y \cdot \left(1 - \frac{y}{15}\right)$$

y = doughnuts/day (thousands) t = time (days)

What ~~will~~ is the carrying capacity of the world Pop?

Assume Logistic Model since Pop is leveling off

p 120 Ties L to max increase:



World pop max increase 87,422,136 in 1989. At that time

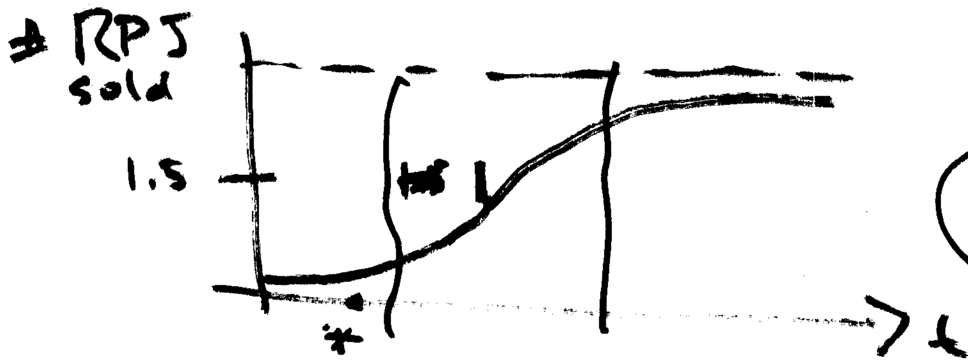
$$\text{pop} = 5,196,333,209 = \frac{L}{2} = 5.2 \text{ billion}$$

$$L \approx 10.4 \text{ billion}$$

y = # Rabbit Print Jumpers sold.

t = # days

Suppose when RPJ went on the market their sales increased at a rate of 12.5%/day. The maximum ~~sale~~ daily sales happened after 1.5 million RPJs were sold.



$\frac{L}{2} = 1.5$

Find a logistic model:

$$\frac{\Delta y}{\Delta t} = .125 \cdot y \cdot \left(1 - y/3\right)$$

y = # RPJ sold (millions)

t = days.

p 130 #3.

Logistic Model

$$\frac{\Delta y}{\Delta t} = \overset{a}{.03134}\, y - \overset{b}{1.5887 \times 10^{-10}}\, y^2$$

p120 $\quad \dfrac{\Delta y}{\Delta t} = a \cdot y - b \cdot y^2$

$a = r \qquad b = \frac{r}{L}$

$L = \frac{a}{b}$

$$\frac{\Delta y}{\Delta t} = r y \left(1 - y/L\right)$$

$$= ry - \frac{r}{L} y^2$$

In Velhurst's model

$r = .03134 \qquad L = \dfrac{.03134}{(1.5887 \times 10^{-10})}$

$= 197$ million

$$\frac{\Delta y}{y} = r - y \cdot \frac{r}{L} \quad \text{— linear model.}$$

y	$\Delta y/y$
⋮	⋮

← linear regression.