(Read Pg. 16 Comic)

Modeling Growth and Decay

$y = Ce^{kt}$

C = Original Amount

y = New Amount

t = time

k = Constant unique to each problem

- Positive (Growth)
- Negative (Decay)

$\log_c A^b = b(\log_c A)$

Cartoon Example

C = 2 mg

y = 9 mg

t = 20 hrs.

Find k.

$y = C \cdot e^{kt}$

$\frac{9}{2} = \frac{2 \cdot e^{k(20)}}{2}$

$\ln 4.5 = \ln e^{20k}$

$\ln 4.5 = 20k(\ln e)$, $\ln e = 1$

$\frac{\ln 4.5}{20} = \frac{20k}{20}$

$.0752038698 = k$

y = ? when t = 30 hrs.

$y = Ce^{kt}$

$y = 2 \cdot e^{k(30)}$

$y = 2 \cdot e^{(.07\ldots)(30)}$

② "Triples"

$y = Ce^{kt}$

$C = 12g$

$y = 6g$

$k =$

$t = 2000$ yrs.

$\frac{6}{12} = \frac{12e^{k(2000)}}{12}$

$\ln .5 = \ln e^{2000k}$

$\frac{\ln .5}{2000} = \frac{2000k(\ln e)}{2000}$

$-3.4657359E-4 = k$

$-.0003465735 9$

$y = Ce^{kt}$

$y = 12 \cdot e^{(-3.4\ldots)800}$

$y \approx 9.09\,g$

$t = 800$ yrs.

$C = 12g$

$y =$

$k =$

"Triples"
in 5 yrs.

$y = Ce^{kt}$

$3 = 1e^{k(5)}$

"40% of
radium leaves
in 5 yrs.

$y = Ce^{kt}$

$60 = 100e^{k(5)}$

(3) $k = .0143694926$ $y = 24245.17$ people

(4) $k = -.22314355 13$ $t = 4.11$ yrs.

(5) $k = 2.197224577$ $C = 370.37$ bacteria

HW
Pg. 344 #1-6