

C12 - 7.0 - Exponential Review

Interest

KEY

$$F = P(1 \pm r)^t$$

F : Future Amount
 P : Present Amount
 r : Interest rate as decimal
 t : time

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

$+$ = Growth
 $-$ = Decay

$$F = P \left(1 \pm \frac{r}{n} \right)^{tn}$$

; with Compounding

n : # of compounding periods per year
 $\frac{r}{n}$: Rate per period
 tn : number of periods

$$n = \frac{1}{T}$$

Yearly; $n = 1$
 Monthly; $n = 12$
 Weekly; $n = 52$

Growth & Decay

$$F = P(r)^{\frac{t}{T}}$$

; Growth with "T"

T : Time/Amount for Rate to **OCCUR**

$$F = 100(.87)^t$$

$$F = 100\left(\frac{1}{2}\right)^{\frac{t}{5}}$$

$$F = Pe^{kt}$$

; Continuous Growth

e : constant ≈ 2.718
 k : proportional constant

Growth	2% = .02	15% = .15	40% = .4	50% = .5	60% = .6	100% = 1.00	Double
$(1 + r)$	$(1 + .02)$	$(1 + .15)$	$(1 + .4)$	$(1 + .5)$	$(1 + .6)$	$(1 + 1.00)$	
(.....)	(1.02)	(1.15)	(1.4)	(1.5)	(1.6)	(2)	(2)

Decay	10% = .1	15% = .15	40% = .4	50% = .5	60% = .6	95% = .95	Half - Life
$(1 - r)$	$(1 - .1)$	$(1 - .15)$	$(1 - .4)$	$(1 - .5)$	$(1 - .6)$	$(1 - .95)$	
(.....)	(.9)	(.85)	(.6)	(.5)	(.4)	(.05)	$\left(\frac{1}{2}\right)$

Method: Arbitrarily set $P = 100\%$ or 100 or 1

Remember: The exponent is the time or the number of time periods.

Intensity

$$I = 10^{b-s}$$

; Earthquakes, pH

$$I = 10^{\frac{b-s}{10}}$$

; Sound

KEY

$$I = \frac{I_b}{I_s} : \text{Intensity}$$

b - Larger Richter, Debibel, pH etc
 s - Smaller Richter, Decibel, pH etc

$pH = -\log(H^+)$
 H^+ - Concentration of Hydrogen

Change of Base

$$x^m \times x^n = x^{m+n} \quad \frac{x^m}{x^n} = x^{m-n} \quad (x^m)^n = x^{m \times n} \quad x^{-a} = \frac{1}{x^a} \quad \frac{1}{x^{-a}} = x^a \quad x^{\frac{m}{n}} = \sqrt[n]{x^m} \quad \left(\frac{x}{y}\right)^{-m} = \frac{y^m}{x^m}$$