C12 - 7.0 - Exponentials Review

P : Payments
Foundations 12

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

Interest

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

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

KEY

F : *Future Amount*
P : *Present Amount*
r : *Interest rate as decimal*
t : *time (in years*)*

;+= *Growth*
−= *Decay*

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

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

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

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

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	$10\% = .1$	$15\% = .15$	$40\% = .4$	$50\% = .5$	$60\% = .6$	$95\% = .95$	$Half - Life$
$(1-r)$	$(1-.1)$	$(1-.15)$	$(1-.4)$	$(1-.5)$	$(1-.6)$	$(1-.95)$	$(1-0.5)$
(.....)	(.9)	(.85)	(.6)	(.5)	(.4)	(.05)	$(\frac{1}{2})$

Growth & Decay

$$F = P(r)^{\frac{t}{T}}$$; Growth with "T"

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

$$F = 100(.87)^t$$
$$n = \frac{1}{T}$$
$$F = 100\left(\frac{1}{2}\right)^{\frac{t}{5}}$$

$$F = Pe^{kt}$$; Continuous Growth

e : *constant* $\approx 2.71..$
k : *proportional constant*

$$\left(1+\frac{r}{\infty}\right)^{\frac{\infty}{r}} \approx e = 2.71..$$

Intensity

KEY

$$I = 10^{b-s}$$; Earthquakes, pH^*

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

$I = \frac{I_b}{I_s}$: *Intensity*
$b - Larger\ Richter, Debibel, pH\ etc$
$s - Smaller\ Richter, Decibel, pH\ etc$

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

Exponent Laws

$x^m \times x^n = x^{m+n}$ $\quad \frac{x^m}{x^n} = x^{m-n}$ $\quad (x^m)^n = x^{m \times n}$ $\quad x^{-a} = \frac{1}{x^a}$

Change of Base

$y_1 = y_2$ Find Intersection (Or use Logs)
Same Base/Exponent: Make Exponents/Bases equal to each other.
Take both/sides to reciprocal exponent of variable/things.

$8 = 2^3$
$81 = 9^2 = 3^4$

$$\frac{1}{x^{-a}} = x^a$$

$$x^{\frac{m}{n}} = \sqrt[n]{x^m}$$

$let\ m = 2^x$

$$\left(\frac{x}{y}\right)^{-m} = \frac{y^m}{x^m}$$