

Applications of Exponential Equations

- * $y = ar^x$ - this is the general form of exponential equations.
- a = initial value
- r = rate of increase/decrease per period
- x = number of periods
- y = final value

$$\log_{(x)}(y)$$

$$y = P_f/P_i$$

$$x = t$$

Ex 4: $P_f = P_i r^{(2.77t)}$ $\rightarrow 1.25 = 1.0277^t$
 plus 25% $\left\{ \frac{125}{100} = \frac{100}{100} \cdot (1.0277)^t \right\} \rightarrow \log_{1.0277}(1.25) = 8.2 = t$

Ex 13: $\frac{85\,000}{50\,000} = \frac{50\,000}{50\,000} r^{24} \rightarrow 1.7 = r^{24}$ 2% monthly interest
 $\rightarrow \sqrt[24]{1.7} = \sqrt[24]{r^{24}} = 1.02 = r$

Ex 19: $m_f = m_i \cdot 0.5^{\frac{t}{HL}}$

$$\frac{580}{600} = \frac{600}{600} (0.5)^{\frac{15}{HL}}$$

$$0.96 = (0.5)^{\frac{15}{HL}} \rightarrow \log_{(0.5)}(0.96)^{\frac{15}{HL}} = 0.058 = \frac{15}{HL} \cdot HL$$

$$\frac{0.058HL}{0.058} = \frac{15}{0.058}$$

$$\text{half life} = 258.62$$