

9.7 Exponential Growth & Decay

Essential Question

How do I apply logarithms to real world situations?

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$$y_t = y_0 e^{rt}$$

y_t : amount after time

r: rate (decimal)

y_0 : initial amount

t: time
↑ consistent

USES...

- Radioactive Decay (Half Life)
- Interest (Continuously vs. n times per year)
- Population Growth

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Essential Question How do I apply logarithms to real world situations?

$$y_t = y_0 e^{rt}$$

y_t : amount after time r : rate y_0 : initial amount t : time

ex. The half life of an isotope of carbon 14 is 5,730 years. An organic sample has 30% of carbon 14 remaining. How old is the sample?

Find RATE

$$\frac{1}{2} = \frac{2}{2} e^{r(5730)}$$

$$0.5 = e^{5730r}$$

$$\frac{\ln 0.5}{5730} = \frac{5730r}{5730}$$

$$r = -0.000121$$

$$\frac{30}{100} = \frac{100}{100} e^{-0.000121 t}$$

$$.3 = e^{-0.000121 t}$$

$$\frac{\ln .3}{-0.000121} = t$$

9953 years

1. Get e by itself
2. Rewrite as ln
3. Use calculator
4. Rewrite equation w/
new rate & solve for
missing info