Exponential Applications

Formulas to Know!!

Exponential Growth Models

...used when a real-life quantity increases by a fixed percentage each year.

$$y = a(1+r)^t$$

a = initial amount   r = percent increase (expressed as a decimal)
(1 + r) is called the *growth factor*   t = time

Exponential Decay Models

...used when a real-life quantity decreases by a fixed percentage each year.

$$y = a(1-r)^t$$

a = initial amount   r = percent decrease (expressed as a decimal)
(1 – r) is called the *decay factor*   t = time

Compound Interest

$$A = P\left(1+\frac{r}{n}\right)^{n \cdot t}$$

A = final amount, P = initial principal amount, r = annual rate (decimal),
t = time (in years), n = number of compounds per year

Continuously Compounded Interest

$$A = Pe^{rt}$$

A = final amount, P = principal, r = rate, t = time (in years)

Half-Life

$$y = a\left(\frac{1}{2}\right)^{\frac{\text{number of years}}{\text{half-life years}}}$$

y = final amount, a = initial amount