

## 3.6 Log Applications

*EQ: How do I solve for exponential growth and decay?*

### Exponential Growth and Decay

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

SOLVE FOR THE RATE FIRST (half-life is not a rate)

**Ex:** A radioactive substance has a half-life of 30 days. If 10 grams are present to start, how many grams will remain after 200 days?

#### Steps:

- Get  $e$  by itself
- Rewrite as a natural log
- Use your calculator to find rate
- Rewrite the equation to solve for the missing information

### Compound Interest

$$A = P\left(1 + \frac{r}{n}\right)^{nt} \text{ Interest Compounded } n \text{ times a year}$$

$$A = Pe^{rt} \text{ Continuously Compounded Interest}$$

**Ex:** \$5000 is invested into an account that earns 3% annual interest. How much would you have after 3 years if the interest is compounded monthly? Continuously?