

## Precalculus Learning Goals - Week 13

This week we'll continue with **Exponentials and Logarithms**.

The general goals for the section **Exponentials and Logarithms** are as follows. At the end of this section, students should be able to:

- *Graph exponential functions and identify their major features.*
- *Understand the significance of exponential functions and their major differences from other types of functions.*
- *Solve equations with exponentials and logarithms.*
- *Use exponential and logarithmic functions to model real-world phenomena.*

**More specifically**, at the end of this week you should be able to:

- Solve equations involving logarithms and exponentials.
- Given two points, find an exponential curve of the form  $P(t) = Ce^{kt}$  passing through those two points.
- Given a population growth, radioactive decay, compound interest, continuously compounded interest, or law of heating and cooling problem, extract relevant information to develop an exponential model and use that model to answer questions.

**Sample Problems.** Here are some sample problems, of the type that you would do to demonstrate that you've learned the material. These are not the only types of problems you may see – they're just a sample.

- Solve for  $x$ :  $\log_2(x - 1) + \log_2(x - 3) = 3$ .
- Solve for  $x$ :  $3^{x+1} = e^{2-x}$ .
- Find an exponential function of the form  $P(t) = Ce^{kt}$  that passes through the points  $(-3, 5)$  and  $(2, 10)$ .
- If a radioactive substance decays by 25% in 50 years, how long will it take it to decay by 50%?
- If an account earns 3% interest, compounded monthly, how long will a deposit take to double in value? What if it is compounded continuously?