**Chapter 3 – Exponential and Logarithmic Functions**

**PreCalculus 3.1 Exponential Functions and their Graphs**

**Exponential Function**

where ,

Example: Use a calculator to evaluate each function at the indicated value of *x*.

**Graphs of Exponential Functions**

points of the graph

this is an increasing function

*x*-axis is a horizontal asymptote

Domain: all real numbers

Range:

This is a continuous function

points of the graph

this is a decreasing function

*x*-axis is a horizontal asymptote

Domain: all real numbers

Range:

This is a continuous function

This graph is a reflection of the graph of () over the *y*-axis

**Transformations of Exponential Graphs**

Example:

Example:

(reflection over *y*-axis)

Example:

(2 units to the right)

Example:

(vertical shrink by )

Example:

(vertical stretch by 3)

(refection over *x*-axis)

Example:

(reflection over *y*-axis)

(up 3)

**Using the One-to-One Property**

iff

Example:

→

Example:

Example:

Example:

**Natural Base *e***

**Graphing Natural Exponential Functions**

**Applications**

**Formulas for Compound Interest**

Compounded *n* times a year

Compounded continuously

Example: A $25000 deposit is made in a trust fund that pays 8.25% interest. The money matures for 26 years. Determine the amount after 26 years if the interest is compounded:

Quarterly

Monthly

Continuously

Example: Let *Q* represent the amount of Radium (half-life = 1620 years).

The quantity of radium present after *t* years is:

1. Sketch a graph of *Q* from to .
2. Determine the initial quantity of radium (when ).
3. Determine the quantity of radium present after 1000 years.