

Chapter 3 Exponential and Logarithmic Functions

Course Number

Instructor

Date

Section 3.1 Exponential Functions and Their Graphs

Objective: In this lesson you learned how to recognize, evaluate, and graph exponential functions.

Important Vocabulary

Define each term or concept.

Transcendental functions

Natural base e

I. Exponential Functions (Page 184)

Polynomial functions and rational functions are examples of _____ functions.

What you should learn

How to recognize and evaluate exponential functions with base a

The **exponential function f with base a** is denoted by _____, where $a > 0$, $a \neq 1$, and x is any real number.

Example 1: Use a calculator to evaluate the expression $5^{3/5}$.

II. Graphs of Exponential Functions (Pages 185–187)

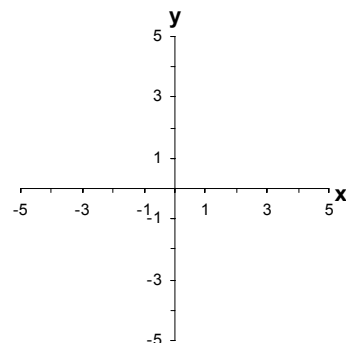
For $a > 1$, is the graph of $f(x) = a^x$ increasing or decreasing over its domain? _____

For $a > 1$, is the graph of $g(x) = a^{-x}$ increasing or decreasing over its domain? _____

For the graph of $y = a^x$ or $y = a^{-x}$, $a > 1$, the domain is _____, the range is _____, and the intercept is _____. Also, both graphs have _____ as a horizontal asymptote.

What you should learn

How to graph exponential functions with base a



Example 2: Sketch the graph of the function $f(x) = 3^{-x}$.

III. The Natural Base e (Pages 187–189)

The **natural exponential function** is given by the function _____.

Example 3: Use a calculator to evaluate the expression $e^{3/5}$.

For the graph of $f(x) = e^x$, the domain is _____,
the range is _____, and the intercept is _____.

The number e can be approximated by the expression
_____ for large values of x .

What you should learn

How to recognize, evaluate, and graph exponential functions with base e

IV. Applications (Pages 190–192)

After t years, the balance A in an account with principal P and annual interest rate r (in decimal form) is given by the formulas:

For n compoundings per year: _____

For continuous compounding: _____

Example 4: Find the amount in an account after 10 years if \$6000 is invested at an interest rate of 7%,
(a) compounded monthly.
(b) compounded continuously.

What you should learn

How to use exponential functions to model and solve real-life problems

Homework Assignment

Page(s)

Exercises