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.

Algebraic functions

Transcendental functions

Natural base *e*

Continuous compounding

I. Exponential Functions (Page 218)

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 219–221)

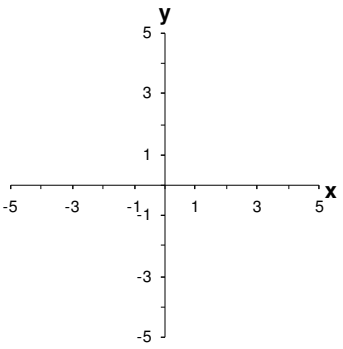
What you should learn
How to graph exponential functions and use the One-to-One Property

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

For $a > 1$, is the graph of $y = a^{-x}$ 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.

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



The graph of the exponential function passes the _____ Test, and therefore, the function is a one-to-one function (and, thus, has an inverse function).

State the One-to-One Property for exponential functions and explain how it may be used to solve simple exponential equations.

III. The Natural Base *e* (Page 222)

What you should learn
How to recognize, evaluate, and graph exponential functions with base *e*

The **natural exponential function** is given by the function _____. In this function, _____ is the constant and _____ is the variable.

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

IV. Applications of Exponential Functions (Pages 223–225)

What you should learn
How to use exponential functions to model and solve real-life applications

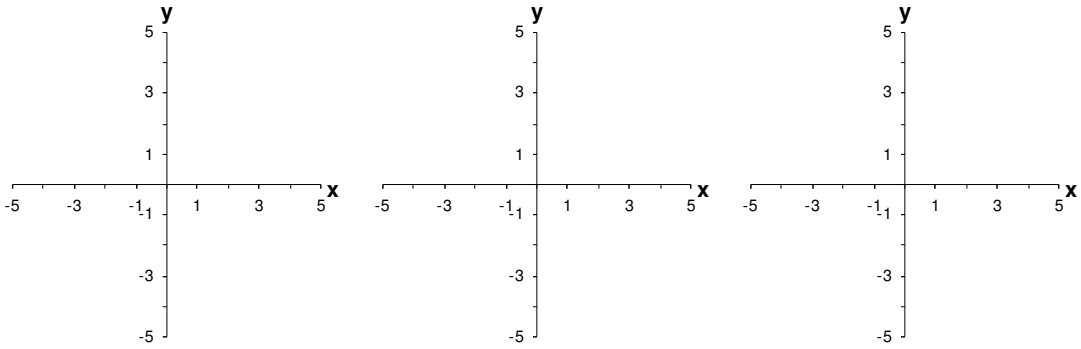
After t years, the balance A in an account with principal P and annual interest rate r (in decimal form) is given by the formulas:

For n compoundings per year: _____

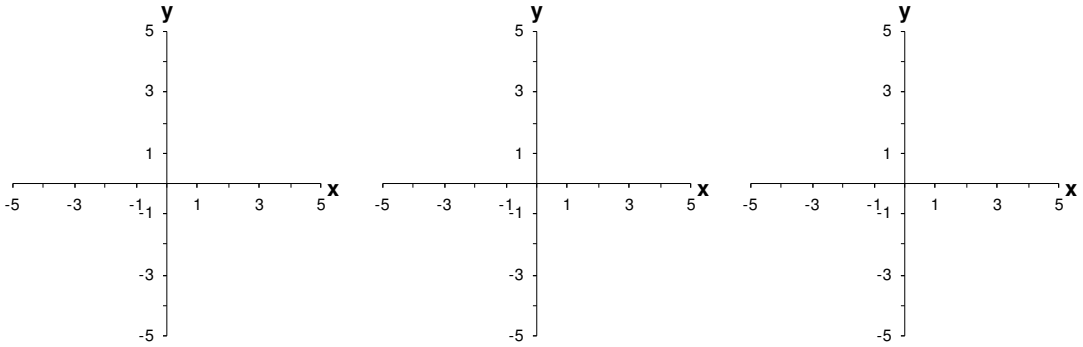
For continuous compounding: _____

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.

Additional notes



Additional notes



Homework Assignment

Page(s)

Exercises