

1 Chapter 6 Transcendental Functions

1.1 Section 6.1: The Natural Logarithm Function

Know the definition of the natural log function and what its derivative is. Know the different properties of the natural log function (Theorem 6.1A) and how to use logarithmic differentiation to simplify some forms of differentiation.

1.2 Section 6.2: Inverse Functions and their Derivatives

Know the existence theorem for an inverse function (Theorem 6.2A). Know how to restrict the domain of a function in order to make it strictly monotonic and invertible. Be able to use the Inverse Function Theorem (Theorem 6.2B) to solve for the derivative of an inverse function at a point.

1.3 Section 6.3: The Natural Exponential Function

Know that the inverse function of the natural log is the natural exponent as well as how to differentiate and integrate the natural exponential function. Know the properties of exponential functions (Theorem 6.3A)

1.4 Section 6.4: General Exponential and Logarithmic Functions

Know how to turn a general exponent of base a into a natural exponent. Know the properties of exponents (Theorem 6.4A) as well as how to differentiate and integrate general exponential functions. Know how to turn a general logarithm into a natural logarithm as well as how to find the derivative of a general logarithm.

1.5 Section 6.5: Exponential Growth and Decay

Be able to identify differential equations that lead to exponential growth and decay (separable DEs) as well as how to solve a differential equation of this form. Be able to solve Newton's Law of cooling/heating problems. Know how to find the general and particular solutions (and what the difference is)

1.6 Section 6.6: First-Order Linear Differential Equations

Be able to identify a first order linear differential equation, write it in the proper form ($p(x)y$ on the left hand side) and solve the differential equation using the integrating factor solution technique. Be able to set up a tank problem as a first order differential equation and solve it. Be able to find both the general and particular solutions.

1.7 Section 6.7: Approximations for Differential Equations

Know what Euler's method does conceptually as well as what the slope field does. Know when Euler's method over/underestimates the solution.

1.8 Section 6.8: The inverse trigonometric functions and their derivatives

Know the trig functions and their restricted domains and what the inverse trig functions are. Know how to take derivatives and integrals involving the inverse trig functions.

1.9 The Hyperbolic Functions and Their Inverses

Know what the hyperbolic functions are and how to differentiate and integrate them. Know what the inverse hyperbolic functions are and how to integrate and differentiate.

2 Chapter 7: Techniques of Integration

2.1 Section 7.1: Basic Integration Rules

Know the standard forms 1-10,16-17 on page 383 and how to use u substitution to get integrals into these forms.

2.2 Section 7.2: Integration by Parts

Know how to use integration by parts to solve definite and indefinite integrals. Be able to identify and solve integral problems that require multiple uses of integration by parts.

2.3 Section 7.3: Some Trigonometric Integrals

Know how to evaluate trig integrals of the 5 forms.