

Learning Outcomes MAT 2020  
Department of Mathematics  
Wayne State University

- Evaluate integrals with the following techniques: direct substitution, integration by parts, trigonometric integrals, partial fractions, approximate integration, and using tables of integrals.
- Know the definition of an improper integral and how to evaluate it in terms of limits.
- Be familiar with common applications of integration: finding the area between curves; finding the volume of a solid; finding the work done by a nonconstant force; computing the average value of a function; computing the moments and center of mass of a laminar plate; and economic applications such as computing consumer surplus.
- Recognize and be able to work with parametric and polar equations. Students should be able to sketch parametric and polar curves (with a graphing calculator), compute tangents to the curve at a given point, and compute the areas enclosed by such curves.
- Use the derivative to form a linear approximation to a curve at a specified point, and use Newton's method to find the root of an equation.
- Know what a sequence is and how to take the limit of a sequence. Recognize the difference between a sequence and a series. Find the sum of a geometric series and of a telescoping series.
- Be prepared to determine the convergence or divergence of an infinite series using a variety of tests including the integral test, comparison tests, alternating series test, ratio test and root test. Understand the difference between absolute and conditional convergence.
- Recognize a power series and functions defined in terms of power series. Find the radius of convergence and interval of convergence of a given power series. Write the Taylor or Maclaurin series expansion of a given function. Use Taylor series to approximate a function with an  $n$ th order polynomial for applications in physics and engineering.
- Understand Cartesian and polar forms of complex numbers and be able to convert between them. Use DeMoivre's Theorem to find the roots of a complex number. Students will also be exposed to complex exponentials and Euler's formula.

Prepared by Catherine Lebieczik, Fall 2013