

**BEMIDJI AREA SCHOOLS**  
Outcomes in Mathematics – AP Calculus II

**Students will review and be responsible for all of the outcomes in AP Calculus I as well as the additional outcomes listed below.**

**I. Parametric, polar, and vector functions**

Students will:

1. Analyze planar curves given in parametric, polar, and vector forms.
2. Find the derivatives of parametric, polar, and vector functions.
3. Utilize antiderivatives of parametrically defined functions in order to solve various applications problems such as finding the length of a curve.

**II. Application of derivatives**

Students will:

1. Use L'hospital's Rule to determine limits and the convergence of improper integrals and series.
2. Solve logistic differential equations

**III. Polynomial Approximations and Series**

Students will:

1. Explore a series as defined by a sequence of partial sums.
2. Understand geometric, harmonic, and alternating series.
3. Investigate the terms of series as areas of rectangles and find their relationship to improper integrals.
4. Use various tests (including the integral, ratio, and comparison tests) to determine the convergence or divergence of a series.
5. Explore the relationship between a given function and its Taylor polynomial approximation.
6. Determine the Maclaurin series and the general Taylor series (centered at  $x=a$ ) for various functions.

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7. Memorize the Maclaurin series for the functions  $e^x$ ,  $\sin x$ ,  $\cos x$ , and  $1/(1-x)$ .
8. Manipulate Taylor series using substitution, differentiation, antidifferentiation, and the formation of new series from old series.
9. Understand the Lagrange error bound for Taylor polynomials.
10. Define various functions using power series.
11. Find the radius and interval of convergence for a variety of power series.