**MATH 160 + MATH 16 OUTLINE**

**PRECALCULUS MATHEMATICS**

**TEXT: Precalculus (OpenStax) by J. Abramson**

[**https://openstax.org/details/books/precalculus**](https://openstax.org/details/books/precalculus)

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| ***Approved: August 23, 2019*** | ***Effective: Fall 2019*** | |
| **MATERIAL TO BE COVERED** | **SECTIONS FROM TEXT** | **RECOMMENDED**  **TIME LINE** |
| Definition and graphs of functions, average rate of change,  transformation of functions, combining functions, one-to-one and  inverse functions; (Modeling with functions is found throughout the book.)  **Math 16 Support Topics:** Set-builder notation and interval notation for writing domains. Solving simple inequalities. Adding and subtracting rational expressions. Simplifying complex rational expressions and radical expressions that appear in difference quotients. Graphing lines, slopes of lines. Graphing and evaluating piecewise-defined functions. Equations of circles and graphing circles.Distance/rate/time formula. Review of formulas used for modeling with functions. Additional time with function modeling. | 1.1 – 1.5, 1.7 | **Math 160:**  7 hours  **Math 16:**  7 hours |
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| Linear functions and models; Quadratic functions and models;  Polynomial functions, Zeros of polynomials; Rational functions  **Math 16 Support Topics:** Factoring techniques. Simplifying rational expressions. Using the quadratic formula. Completing the square. Dividing monomials and polynomials. Multiplying complex numbers. Additional time with asymptotes. Additional time with sign analysis of polynomial and rational inequalities. | 2.1 – 2.3  3.1 – 3.8 | **Math 160:**  7.5 hours  **Math 16:**  6.5 hours |
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| Exponential and logarithmic functions; Logarithmic properties;  Exponential and logarithmic equations; Exponential and logarithmic  models  **Math 16 Support Topics:** Simplifying exponential expressions using exponent rules. Additional time with exponential and logarithm basics. Basic exponential and logarithmic equations. Additional time with exponential function modeling. | 4.1 – 4.7 | **Math 160:**  6.5 hours  **Math 16:**  3.5 hours |
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| The unit circle and angle measure, trigonometric functions of angles,  linear and angular velocity; Right triangle trigonometry and  applications; Graphs of trigonometric functions; Inverse trigonometric  functions and applications  **Math 16 Support Topics:** Additional time with evaluating trigonometric functions, especially in radians. Additional time evaluating inverse trigonometric functions. | 5.1 – 5.4  6.1 – 6.3 | **Math 160:**  7.5 hours  **Math 16:**  3 hours |
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| Trigonometric identities; Sum, difference, multiple-angle and half-angle  formulas; Solving trigonometric equations  **Math 16 Support Topics:** Review of trigonometric identities. Solving simple trigonometric equations. | 7.1 – 7.3, 7.5 | **Math 160:**  5 hours  **Math 16:**  2 hours |
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| Vectors, the dot product, and applications  **Math 16 Support Topics:** Review of vector operations. Additional time with applications involving vectors. | 8.8 | **Math 160:**  2 hours  **Math 16:**  1 hour |
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| Systems of nonlinear equations; Partial fractions  **Math 16 Support Topics:** Adding and subtracting rational expressions when LCD is needed.Review ofsubstitution and elimination methods for solving system of equations. Solving systems of linear equations for partial fractions. | 9.3 – 9.4 | **Math 160:**  3.25 hours  **Math 16:**  2 hours |
| Ellipses, hyperbolas, parabolas  **Math 16 Support Topics:** Identifying conic sections from their equations. | 10.1 – 10.3 | **Math 160:**  3.5 hours  **Math 16:**  1 hour |
| Infinite sequences and summation notation, arithmetic and geometric  sequences; Mathematical induction; the Binomial Theorem.  **Math 16 Support Topics:** Algebra to support induction proofs. Additional time with writing formulas for th term of sequence. Additional time finding partial sums and infinite sums. | 11.1 – 11.4, 11.6 | **Math 160:**  6.5 hours  **Math 16:**  2.5 hours |
| Optional sections: (At least one of the following topics) Polar coordinates, limits, derivatives. For Riemann Sums and integrals see chapter 5 of OpenStax Calculus - <https://openstax.org/details/books/calculus-volume-1> | 8.3 – 8.4  12.1 – 12.4 | **Math 160:**  3 hours |
|  |  | **Total Math 160:**  51.75 hours  **Total Math 16:**  28.5 hours |

All hours listed are face-time; i.e. breaks are administered by the instructor separately and

are in addition to the hours listed.

Math 160 (4 units): 53.5 teaching hours + 4 hours exams + 2.5-hour final = 60 hours

Math 16 (2 units): 30 teaching hours

### Math 16: timeline does not include time for exams. Exams in the support course are at the discretion of the professor.

### Math 16 is a 15-week course. The corequisite course does not meet during finals week.

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**Math 160 Notes:**

* This course is a prerequisite for Math 180 (Calculus) and, consequently, it is important that the students develop sufficient skills and background to increase their chance of success in calculus.

**Math 16 Notes:**

* Math 16 is a Pass/No Pass course and is not subject to department grading policy.

**Submitted by:** Arellano, Beydler, Birca, Chavez, Kim, Kojima, Lee, Morales, Perez, Sholars, Tatoian, Tran, and Wohlgezogen.

Math Department Policy can be found at: <https://www.mtsac.edu/math/departmentpolicy.html>