

**MATH 7 Course Syllabus**  
**Winter Session, 2017**  
**Instructor: Brian Rodas**

**Class Room and Time:** MC 66

M-F 10:15am-1:05pm

**Office Room:** MC 35

**Office Phone:** (310)434-8673

**Office Hours:** By appointment only.

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**Class Website:** [http://homepage.smc.edu/rodas\\_brian](http://homepage.smc.edu/rodas_brian)

**Text:** Stewart, James. *Calculus*. Eighth edition, Cengage Learning Co., 2016.

**Course Description:** This course is intended for computer science, engineering, mathematics and natural science majors. Topics in this first course include limits, continuity, and derivatives and integrals of algebraic and trigonometric functions, with mathematical and physical applications. The prerequisite is MATH 2 with a grade of C or better.

**Format of Course:** The first 10-15 minutes of each class will be devoted to addressing students' questions regarding homework or material from the previous section. The remainder of the class will be spent presenting new material. There will be a 15-20 minute break sometime in the middle of class.

**Homework:** Homework will be assigned daily but not collected. The problems assigned are practice problems in understanding the material covered for the day. It has been known that a genuine understanding and completion of the homework results in quality performance. You are responsible for all material and information given in class.

**Worksheets:** Worksheets will be given periodically. They consist of problems designed to understand the material, promote cooperative learning and review for each exam. These problems are to be done in groups. They will be graded and they give me a good indication of attendance.

**Quizzes:** Quizzes will be given periodically. They will be approximately 10-15 minutes long. It has been my nature to give quiz problems identical to the homework. Therefore it would be in your best interest to do the homework. Each quiz is graded out of ten points. The lowest quiz score will be dropped.

**Exams:** There will be five exams and a final. Each exam is worth 100 points. The lowest exam will be scaled out of 50 points. So if your test scores are 100, 90, 80, 70, and 60, then your test average is  $(100+90+80+70+30)/450$ . The final is worth 200 points and is cumulative. You must show all necessary work to receive full credit. NOTE: A diagnostic exam will be given on the 2nd class day. All students are expected to take this exam in order to stay in the class. You will need a large blue book.

**Calculators:** Although the use of calculators are not permitted for exams or quizzes, they can be useful for doing tedious calculations and graphing. I encourage you to check your answers on the calculator when doing your homework but do not become dependent on the calculator. They will be extremely handy for performing numerical integration.

**Grading:**

|                |            |
|----------------|------------|
| Top four exams | 400 points |
| Lowest exam    | 50 points  |
| Quizzes        | 75 points  |
| Worksheets     | 25 points  |
| Final exam     | 200 points |
| Total          | 750 points |

The expectation is that a letter grade will be given using the following scale for the semester average: 90-100%(A), 80-89%(B), 70-79%(C), 60-69%(D), 0-59%(F).

**Academic Conduct:** You are expected to abide by Santa Monica College's code of academic conduct on all exams, quizzes and homework. Copying homework solutions or quiz or test answers from someone is considered cheating as is altering a quiz or examination after it has been graded or giving answers to someone during an exam or quiz. If caught cheating or using an electronic device during an exam, the parties involved will receive a zero on the exam and an academic dishonesty report will be filed. Cell phones are to be turned off for the duration of each class.

Since attendance is **absolutely essential** for normal progress in class, a student is expected to be in class regularly and on time. Students are responsible for all material given each class. **There are no makeup quizzes or exams.** Missing one class during winter session is almost the equivalent of missing a week of class during a regular 16 week session and puts you in danger of being dropped. Refer to the school's web page, [www.smc.edu](http://www.smc.edu), for withdrawal dates. Withdrawing from the class is the student's responsibility. Students who fail to withdraw after the withdrawal deadline will receive a letter grade.

**Entry Skills for Math 7:** Prior to enrolling in Math 7 students should be able to:

- A. Determine domain, range, symmetry and inverse, if it exists, of a relation.
- B. Analyze and graph a given function, including but not limited to piecewise defined, polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric functions.
- C. Use transformation techniques including vertical and horizontal shifts, compression, stretching, and reflection over the  $x$ - or  $y$ -axis to sketch the graph of a function.
- D. Use the language and standard mathematical notation of the algebra of functions.
- E. Determine algebraic combinations and compositions of functions and state their domains.
- F. State and apply the unit-circle and right triangle definitions of trigonometric functions and their inverses.
- G. State and apply fundamental trigonometric identities and the sum, difference, double-angle and half-angle identities.
- H. Factor polynomials using rational and complex zeros.
- I. Solve polynomial, rational, exponential, logarithmic, trigonometric and inverse trigonometric equations.
- J. Write algebraic and trigonometric relationships to solve application problems, including solution of triangles.
- K. Prove trigonometric identities.
- L. Classify, analyze and graph conic sections given any quadratic equation in two variables. (Excludes rotation)
- M. Solve systems of nonlinear equations.
- N. Prove statements using mathematical induction.
- O. Apply the binomial theorem to expand a binomial and find required intermediate term.
- P. Use the language and notation of sequences and series. Determine any term in a sequence.
- Q. Evaluate, manipulate and interpret summation notation.

**Exit skills for MATH 7:** Upon successful completion of this course, the student will be able to:

- A. Evaluate limits using basic limit theorems and the epsilon-delta definition.
- B. State and apply the definition of continuity to determine a function's points of continuity and discontinuity.
- C. Differentiate elementary functions using basic derivative theorems and the definition of the derivative and implicit differentiation and inverses.
- D. Integrate elementary functions using basic integral theorems and evaluate a definite integral as a limit using the definition of the definite integral.
- E. Find equation of the tangent line to graph of a function.
- F. Solve derivative application problems including optimization, related rates, linearization, curve sketching and rectilinear motion.
- G. Solve integral application problems including area, volume, arc length and work.
- H. State and apply the Mean Value theorems, Extreme Value theorem, Intermediate Value Theorem, Fundamental Theorem of Calculus, and Newton's Method.

## SCHEDULE OF LECTURES, HOMEWORK & EXAMS

| Date | Section           | Material   | Homework  |
|------|-------------------|--|---|
| 1/3  | 1.1<br>1.2<br>1.3 | Precalculus Review<br>Precalculus Review<br>Precalculus Review       | 1-4,7-10,25-79odd<br>5-15odd<br>1-23odd, 31-51odd,56,65             |
| 1/4  | 1.5               | Precalculus Review/Exam<br>The limit of a Function                   | 1-11odd, 29-39odd   |
| 1/5  | 1.6<br>1.7        | Limit Laws<br>Definition of Limit                                    | 1-31odd,37,39,42,44,47-53odd,59,64<br>1-4, 15-31odd                 |
| 1/6  | 1.8               | Continuity   | 3,5,7,11-21odd,22,25-31odd  |
| 1/9  | 1.8               | Continuity<br>REVIEW(Worksheet)                                      | 35,39,41,45,53-56<br>3-51odd  |
| 1/10 | 2.1               | <b>EXAM 1 on Chapter 1</b><br>Derivatives & Rates of Change          | 1-17odd,21,27,31-43odd  |
| 1/11 | 2.2<br>2.3        | Derivative as a function<br>Differentiation formulas                 | 1-11odd,17-29,30,45,55,57,62<br>1-43odd,51,55-63odd,77-85odd,97,101 |
| 1/12 | 2.4<br>2.5        | Derivatives of Trig Functions<br>Chain Rule                          | 1-33odd,29,31,33,39,42<br>7-51odd,59-63odd,66,75                    |
| 1/13 | 2.6<br>2.8        | Implicit Differentiation<br>Related Rates                            | 5-31odd,35,45,59<br>1-25odd,29,31,33,44                             |
| 1/16 |                   | Holiday (No class)   |   |
| 1/17 | 2.9               | Linear Approximations & Differentials<br>REVIEW(Worksheet)           | 1,3,11-27odd,31,33<br>1-6,11-46odd,53,55,59,61,68,73,77-83odd       |
| 1/18 | 3.1               | <b>EXAM 2 on Chapter 2</b><br>Max & Min Values                       | 3,5,7,11,15-27odd,29-41odd,45-57odd                                 |
| 1/19 | 3.2<br>3.3        | The Mean Value Theorem<br>How Derivatives affect shape of graphs     | 5-9odd,11-17odd,21,26,29,31<br>(given in class)                     |
| 1/20 | 3.3<br>3.4        | How Derivatives affect shape of graphs<br>Limits at Infinity         | (given in class)<br>3,7-29odd,48,50,53,57,63                        |
| 1/23 | 3.5<br>3.7        | Summary of Curve Sketching<br>Optimization                           | 1-39odd, 45<br>3-15odd,21,25,33,35,37                               |
| 1/24 | 3.7<br>2.7        | Optimization Problems<br>Rates of Change                             | 48, 54<br>(given in class)  |
| 1/25 | 3.8               | Newton's Method<br>REVIEW(Worksheet)                                 | 7,11,13<br>1-27odd,36,41,45,49                                      |
| 1/26 | 3.9               | <b>EXAM 3 on Chapter 3, Section 2.7</b><br>Antiderivatives           | 1-41odd,53-57odd,60   |
| 1/27 | 4.1<br>4.2        | Areas<br>Definite Integral   | 1,3,5,13,26<br>9,11,17-29odd,35,37,39,47,51,55,65                   |
| 1/30 | 4.3<br>4.4        | Fundamental Theorem of Calculus<br>Indef. Integrals                  | 7-37,39,41,53,55<br>5-15, 19-41odd, 55,57                           |
| 1/31 | 4.5<br>5.5        | Substitution Rule<br>Average Value of Functions                      | 7-29odd, 35-51odd,59<br>1-9odd,14                                   |
| 2/1  | 5.5               | Average value of Functions<br>REVIEW(Worksheet)                      | 1-9odd, 14<br>(given in class)                                      |
| 2/2  | 5.1               | <b>EXAM 4 on Chapter 4 &amp; Sect.3.9,5.5</b><br>Area between curves | 1-29odd   |

|     |            |   |                                       |
|-----|------------|---|---------------------------------------|
| 2/3 | 5.2<br>5.3 | Volumes<br>Volumes by Cylindrical Shells                    | 1-29odd, 54,56,58<br>3-25odd,37,41,45 |
| 2/6 | 5.4<br>8.1 | Work<br>Arc Lengths   | 1-13odd,17,21,23,26<br>3,9-11,13,33   |
| 2/7 | 6.1        | Inverses<br>REVIEW(Worksheet)                               | 23,25,27,31,35-41odd<br>1-31odd       |
| 2/8 |            | <b>EXAM 5 on Chapter 5,Sect.6.1,8.1</b><br>REVIEW for final |                                       |
| 2/9 |            | FINAL EXAM  |                                       |

The instructor does reserve the right to add or modify the syllabus at the instructor's discretion.

**Course Content:**

- 8% -Review topics from precalculus (algebra functions, trigonometry, sequences, series)
- 13% -Limits and continuity (epsilon-delta, limits, one-sided limits, limits involving infinity, definition & properties of continuous functions)
- 21% -Derivatives (definition, techniques of differentiation, derivatives of rational & trig functions, Chain Rule, differentials & linearization, implicit differentiation, tangent lines, rates of change)
- 23% -Applications of the derivative (extreme values of functions, the Mean Value Theorem, the first and second derivative tests, curve sketching, optimization, rectilinear motion, Newtons Method)
- 17% -Integrals (antiderivatives, indefinite integrals, definite integral, Fundamental Theorem of Calculus, Mean Value Theorem for integrals, numerical integration)
- 14% -Applications of the definite integral (area; volumes by slicing, disks, washers, cylindrical shells; arc length; work)
- 4% -Review for final exam

**Student Learning Outcomes:** The knowledge, skills, or abilities that the student will demonstrate by the end of the semester.

- Given an algebraic or trigonometric function, students will evaluate and apply limits and prove basic limit statements.
- Given an algebraic or trigonometric function, students will differentiate the function and solve application problems involving differentiation.
- Given an algebraic or trigonometric function, students will integrate the function and solve application problems involving integration.