

Baruch College  
Department of Mathematics

**MATH 3006 SYLLABUS  
INTEGRAL CALCULUS**

Textbook or ebook: Calculus, 11<sup>th</sup> Edition, by Larson and Edwards, Cengage Learning Publisher. The WebAssign homework correlates with the section number and topic in the textbook.

Calculus Review: The material in the review section is a prerequisite for Math 3006. WebAssign homework for the review problems is included in the corresponding sections of the assignments below.

Antiderivatives and	4.1	P. 255: 5-27(odd), 37, 57, 59, 65
Indefinite Integration	4.5	P. 305: 5, 6, 9-33(odd), 61, 63, 65, 67
Fundamental Theorem	4.4	P. 292: 9-23(odd), 37, 41, 43, 45, 53
Natural Logarithmic Function:	5.1	P. 321: 43-61(odd), 75, 77, 79
Differentiation and Integration	5.2	P. 330: 5-11(odd), 23, 51-55(odd)
Exponential Functions:	5.4	P. 348: 33-41(odd), 61, 64, 91-97(odd)
Differentiation and Integration		

Lesson #	Topics	Reading	Homework
1	Trigonometric Functions	<i>P.4</i>	P. 38: 5-11(odd),15,16,17,18, 19, 21, 22, 33-36(all), 47, 48,49, 55, 56, 58
2	Trigonometric Limits	<i>1.3</i>	<i>P. 71: 27 – 35 (odd), 63 – 73 (odd)</i>
3	Differentiation of Trigonometric Functions	2.2 2.3 2.4 2.5 3.9	<i>P. 118: 25, 26, 37, 38</i> <i>P. 129: 41, 42,43, 49, 50, 53, 55, 59, 61</i> <i>P. 140: 37, 39, 42, 43, 47, 49</i> <i>P. 149: 15, 17, 31</i> <i>P. 240: 27, 28</i>
4	Mean Value Theorem; Indefinite Integration for Trigonometric functions	3.2 4.1 4.5	<i>P. 178: 5, 39, 42, 43, 47</i> <i>P. 255: 29-35 (odd),</i> <i>P. 305: 7, 8, 39, 41, 42, 43,45, 46, 47, 53-59(odd)</i>
5	Area	4.2	<i>P. 267: 5-13(odd), 17-35(odd), 36, 37, 39, 47,49, 51</i>
6	Riemann Sums and the Definite Integral	4.3	<i>P. 277: 5, 7, 9, 13, 14, 17, 19, 23, 31, 39, 41, 43</i>
7,8	Fundamental Theorem: Trigonometric functions and substitution;	4.4 4.5	<i>P. 292: 29, 33, 35, 39, 40, 75, 77, 83</i> <i>P. 305: 71, 72</i>
	Natural Logarithmic Function, Differentiation and Integration	5.1 5.2	<i>P. 321: 63, 65, 71. 75, 77</i> <i>P. 330: 18, 23, 26, 27, 39, 41, 56, 57, 60</i>
	Exponential Function, Differentiation and	5.4 5.5	<i>P. 348: 76, 99-107 (odd)</i> <i>P. 358: 39, 61, 65, 69, 70</i>

	Integration; bases other than $e$		
9	Inverse Functions	5.3	<i>P. 339:</i> 5, 7, 11, 13, 17, 19, 22, 27, 29, 35, 39, 43, 64, 67, 70, 71
10	Inverse Trigonometric Functions and Differentiation	5.7	<i>P. 379:</i> 11, 13, 17, 25, 26, 31, 35, 37, 41, 45, 47, 48, 49, 52, 53, 54
11	Inverse Trigonometric Functions and Integration	5.8	<i>P. 387:</i> 3, 4, 6, 7, 9, 11, 13, 19, 23, 25, 29, 33, 36, 40, 41
12	Area of a region between two curves	7.1	<i>P. 450:</i> 5-11, 17, 23, 25, 29, 33, 35, 39, 45
13	Volume: The Disc Method	7.2	<i>P. 461:</i> 5-19 (odd), 23, 25, 27, 29, 33, 40
14	Volume: The Shell Method	7.3	<i>P. 470:</i> 3-19 (odd), 25, 27, 29, 31, 47
15	Arc Length and Surfaces of Revolution	7.4	<i>P. 481:</i> 5-15 (odd), 21, 25, 27, 29, 37, 39, 41, 57, 59
16	Integration Review	8.1	<i>P. 520:</i> 7, 9, 11, 12, 13, 19, 21, 23, 25, 26, 27, 33, 37, 39, 41, 43, 60, 61, 62, 65, 66, 69, 73, 74, 75, 79 <i>P. 305:</i> 53, 55, 56, 57 <i>P. 330:</i> 31, 59
	Integration by Parts	8.2	<i>P. 529:</i> 5, 7, 8, 9, 15, 20, 25, 31, 33, 43, 45, 67, 68, 85
17	Trigonometric Integrals	8.3	<i>P. 538:</i> 3, 4, 7, 9, 11, 13, 22, 25, 29, 43, 45, 49, 51, 53, 55, 59, 63, 67, 77(a)
18	Trigonometric Substitution	8.4	<i>P. 547:</i> 5, 9, 13, 19, 20, 21, 23, 25, 27, 29, 32, 37
19	Partial Fractions	8.5	<i>P. 557:</i> 3, 5, 6, 7, 9, 11, 14, 15, 17, 18, 20, 23, 27
20	Numerical Integration	8.6	<i>P. 564:</i> 7, 11, 16, 23, 26, 29
21	Indeterminate Forms	5.67	<i>P. 369:</i> 7, 9, 11, 13, 17, 19, 23, 25, 35, 43, 45, 49, 57, 69, 72
22	Improper Integrals	8.8	<i>P. 579:</i> 5, 7, 9, 13, 15, 22, 24, 25, 29, 31, 33, 35, 37, 39, 49, 50, 54, 55
23,24	Conic Sections	10.1	<i>P. 696:</i> 5-10, 12, 15, 17, 19, 20, 23, 26, 27, 31, 33, 35, 37, 38, 39, 41, 45, 47, 49, 65, 73, 81

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**LEARNING GOALS OF COURSE:** Upon completion of this course, students will be able to:

- Compute limits, derivatives, and integrals of trigonometric functions and their inverses; apply trigonometric functions to the study of periodic phenomena.
- Compute integrals of functions of one variable using various techniques such as integration by parts, trigonometric substitution, and partial fraction decomposition; use integration to calculate areas, arc length, and volume and surface area of a surface of revolution.
- Use numerical integration techniques such as Riemann sums, Simpson's Rule, and the Trapezoidal Rule to approximate the value of definite integrals.
- Identify an indeterminate form, and use L'hôpital's Rule to compute the limit.
- Determine the convergence or divergence of an improper integral. Compute the value of a convergent improper integral and/or use numerical integration to estimate the value.