

Course outline

The topics for MATH 101 are organized into 12 “units” as given in the table below. Each “unit” corresponds to a single WeBWorK assignment with the corresponding number. A “unit” represents *approximately* one week (150–160 minutes) of class time, although not necessarily an exact calendar week. This table indicates the sections in each of the recommended textbooks where the unit's topics can be found (not all topics appear in all books).

	Topics	CLP	Apex	Strang	Active	MOOC	Stewart
Unit 1	Definition of the integral	1.1	5.2, 5.3	5.1, 5.5	4.1, 4.2, 4.3	12.1, 12.2	5.1
Unit 2	Basic properties of the definite integral The Fundamental Theorem of Calculus	1.2 1.3	5.1, 5.4	5.2, 5.5, 5.7	4.3, 4.4, 5.1, 5.2	13.1	5.2, 5.3, 5.4
Unit 3	Substitution Area between curves	1.4 1.5	5.4, 6.1, 7.1	5.4, 5.5, 8.1	5.3, 6.1	13.2, 14.1	5.5, 6.1
Unit 4	Volumes, work and averages Integration by parts	1.6, 2.1, 2.2 1.7	7.2, 7.5 6.2	8.1, 8.6 7.1	6.2, 6.4 5.4	14.3, 15.1	6.2, 6.4 7.1
Unit 5	Trigonometric integrals Trigonometric substitutions	1.8 1.9	6.3, 6.4	7.2, 7.3		14.2	7.2, 7.3
Unit 6	Partial fractions Numerical integration	1.10 1.11	5.5, 6.5	5.8, 7.4	5.5, 5.6		7.4, 7.7
Unit 7	Improper integrals	1.12	6.8	7.5	6.5		7.8
Unit 8	Centre of mass Separable differential equations Sequences	2.3.1 2.4.1 3.1	5.4, 8.1	2.6, 5.6, 6.5, 8.5	4.3, 6.3, 7.4, 8.1		6.5, 8.3, 9.3, 11.1
Unit 9	Series The Divergence Test The Integral Test	3.2 3.3.1 3.3.2	8.2, 8.3	6.6, 10.0, 10.2	8.2, 8.3		11.2, 11.3
Unit 10	The Comparison Test The Alternating Series Test	3.3.3 3.3.4	8.3, 8.5	10.2, 10.3	8.3, 8.4		11.4, 11.5
Unit 11	The Ratio Test Absolute and conditional convergence Power series: definitions	3.3.5 3.4 3.5.1	8.4, 8.5, 8.6	10.1, 10.2, 10.3, 10.5	8.3, 8.4, 8.6		11.6, 11.8
Unit 12	Working with power series Taylor series	3.5.2 3.6	8.6, 8.8	10.1, 10.4, 10.5	8.5, 8.6		11.9, 11.10

If you hadn't guessed already, the columns correspond to the [various notes and textbooks](#) that we recommend for MATH 101 students:

- **CLP** refers to the [UBC MATH 101 course notes](#).
- **APEX** refers to APEX Calculus by Hartman *et al*.
- **Strang** refers to Calculus Online Textbook from MIT Open Courseware by Strang.
- **Active** refers to Active Calculus by Boeklins, Austin, and Schlicker.
- **MOOC** refers to MOOCulus by Fowler and Snapp.
- **Stewart** refers to Calculus: Early Transcendentals by Stewart.

Several of the formulas from the CLP notes are complicated enough that you do not have to memorize them: if a midterm or final exam question requires the formula to be used, then it will be included in the statement of the problem. You do need to know what they mean and how to work with them, however. The **formulas that you do not have to memorize** are:

- the summation formulas in Theorem 1.1.6 (although, for formula (b), you should understand summation notation well enough to derive this formula on the spot)
- the integral of $\sec x$, found in the optional Section 1.8.3
- the formulas for numerical integration error bounds in Theorem 1.11.12
- the formula for the *partial sum* of a geometric series, from Section 3.2. (You *are* responsible for the formula for the sum of an entire geometric series.)

This list will be updated during the semester. If a formula does not appear on this list, that means you are responsible for either memorizing it or being able to derive it as you go.

If you want to brush up on material from your mathematical past that is used in MATH 101, the [resources page](#) contains links to some helpful files.

The list of [MATH 101 learning outcomes](#) is very helpful—it contains specific items of knowledge and specific skills that you will be gaining in connection with the topics above. You can also get an excellent sense of what is being covered in this course by looking at the [WeBWork and suggested homework problems](#).