Department of Mathematics & Statistics
Concordia University



MATH 203: Differential & Integral Calculus I (Summer 2026)

Instructor:	_____
Email Address:	_____
Lectures:	_____
Office Hours:	Your professor will announce their office hours during which they will also be available to give a reasonable amount of help. Note, however, that if you missed a class, it is not reasonable to expect your professor to cover the missed material for you.
Important:	Students should get the above information from their instructor and from the course Moodle site. The instructor is the person to contact should there be any questions about the course.
Prerequisite:	MATH 201 or an equivalent Functions course.
Pre-test:	A special pre-test is posted on the META MATH-203 Moodle site to help students determine if their prerequisite mathematical background is strong enough to take this course successfully. Students are encouraged to go to the Meta site, read "README: About the Pre-test" file and then take the test to see where they stand. The results of the test may be used by the course coordinator to advise students on what remedial actions students can take if they perform poorly on this pre-test.
Course Website:	Moodle

Text
Thomas' Calculus: Early Transcendentals, Single Variable.

The hard-copy text can be purchased in the Concordia bookstore, https://www.bkstr.com/concordiastore/home.
Note: Students should order textbooks as early as possible, especially for printed versions in case books are backordered or there are any shipping delays.

The e-text is included in the MyLabMath online system the access card to which can be purchased at Concordia bookstore or at the Pearson site,
https://pearsonhighered.onthehub.com/WebStore/OfferingDetails.aspx?o=732ac655-d958-ef11-8168-000d3af41938&pmv=00000000-0000-0000-0000-000000000000
Please note that Concordia bookstore can price-match the prices found on the Pearson site.

Tutorials

The material on this course requires a lot of practice and a strong background in arithmetic and algebra. The Department has therefore organized special tutorial sessions to review required topics in arithmetic and algebra and to practice the course material. The tutorials are conducted every week to provide additional support to students. Students are strongly encouraged to participate and be active in these problem-solving sessions. Tutorials are an important resource to help students succeed in this course. You will find on the Moodle site all the information regarding location and dates for these tutorials.

Math Help Centre

A Math Help Centre staffed by graduate students is available. It is a drop-in service, and you can ask questions regarding the course material and background mathematics. The schedule of its operation and its location will be posted in the Department and on the Department webpage
https://www.concordia.ca/artsci/math-stats/services.html#academic-support

WeBWorK

Every student will be given access to an online system called **WeBWorK**. The system offers many exercises and practice problems. Students must use this system to do online assignments (see Assignments below). Before each exam (midterm and final), numerous practice problems will be posted on **WeBWorK** to aid students in their preparation.

MyLab Math

Every student who purchases the hard-copy version of the textbook will be given access to one more online system called **MyLab Math**. This system contains an E-version of the textbook, as well as a large number of various resources, like practice exercises, and typical examples on different topics, often with solutions, video materials, etc., that will help you master the course material and are recommended to use actively.

Assignments

Students are expected to submit assignments online using **WeBWorK**. Late assignments **will not** be accepted. Assignments contribute 10% to the final grade. Working regularly on assignments is essential for success in this course. Students are also strongly advised to do as many problems as their time permits from the list of recommended problems included in this outline, as well as work on the practice exercises opened in WeBWorK and in MyLab Math.

Calculators

Only calculators approved by the Department (with a sticker attached as proof of approval) are permitted for the class test and final examination. For the list of Approved calculators see
https://www.concordia.ca/artsci/math-stats/services/advising/calculators.html

Midterm Test

There will be one **midterm test** in Class #7. The test will be 90 minutes long and will be based on the material of all previous classes (Lectures 1-6). The midterm text contributes up to 30% of your final grade **(see the Grading Scheme below**). **The midterm test will be held during lecture time.**

There is no make-up or alternate midterm test. For students who are unable to write the midterm test (for ANY reason), the final exam weight will be elevated automatically to 90% (as per the Grading Scheme below). It is strongly recommended, however, that students prepare themselves for, and do take the midterm test because:

- The midterm test may contribute 30% to your grade, so it may help elevate the grade received in the course; and
- The midterm test is an important opportunity to get timely feedback on your progress in the course.

Final Exam

The final examination will be three hours long and will cover all the course material.

PLEASE NOTE: Students are responsible for finding out the date and time of the final exam once the schedule is posted by the Examinations Office. Any conflicts or problems with the scheduling of the final exam must be reported directly to the Examinations Office, **not** to your instructor. It is the Department's policy and the Examination Office's policy **that students are to be available until the end of the final exam period. Conflicts due to travel plans will not be accommodated.**

Grading Scheme

The final grade will be based, in all cases, on the ***higher*** of the two options:
(a) 10% for the assignments, 30% for the midterm test, 60% for the final exam.
(b) 10% for the assignments, 90% for the final exam.

IMPORTANT: PLEASE NOTE THAT THERE IS NO "100% FINAL EXAM" OPTION IN THIS COURSE.

Note: All of Chapter 1 is a review of material that is covered in prerequisite courses and is important for this course. If you don't know this preliminary material thoroughly, or if you feel you don't know it well enough after the first class or so you may want to consider dropping the course and taking MATH 201 instead.

The following schedule of topics is approximative.

Class #	Problems		Topics	
1	1.2	Combining Functions; Shifting & Scaling Graphs	p.18:	1, 3, 5, 7, 9, 15, 17, 19, 21, 23, 25
	1.3	Trigonometric Functions	p.27:	7, 9, 11, 15, 19, 25, 29, 37, 47, 49
	1.4	Exponential Functions	p.37:	3, 7, 9, 11, 13, 15, 21, 25, 27, 33
2	1.5	Inverse Functions and Logarithms	p.49:	9, 17, 21, 29, 31, 41, 47, 53, 63, 71
	2.1	Rates of change and Tangent Lines	p.61:	1, 3, 5, 23, 25
3	2.2	Limit of Function and Limit Laws One-Sided Limits	p.71:	3, 5, 13, 15, 19, 25, 27, 37, 55, 65
	2.4	Limits Involving Infinity; Asymptotes	p.88:	3, 7, 9, 15, 17, 19, 33, 37
	2.5	(omit oblique asymptotes)	p.112:	1, 9, 11, 21, 27, 35, 41, 71, 87, 89
4	2.6	Continuity	p.100:	5, 13, 19, 29, 31, 41, 45, 49, 61
	3.1	Tangent Lines and the Derivatives	p.123:	5, 11, 17, 21, 25, 31, 33
	3.2	The Derivative as a Function	p.130:	3, 9, 11, 17, 23, 25, 55, 59
5	3.3	Differentiation rules	p.142:	5, 7, 11, 15, 21, 23, 29, 43, 47, 61
	3.5	Derivatives of Trigonometric Functions	p.158:	3, 7, 11, 13, 19, 23, 31, 37
6	3.6	The Chain Rule	p.166:	5, 7, 13, 21, 23, 31, 35, 37,45, 63, 77
	3.7	Implicit differentiation	p.172:	1, 5, 11, 15, 25, 27, 37, 39, 4
7	**MIDTERM TEST** (includes the material of the Lectures 1-6)			
8	3.8	Derivatives of Inverse Functions, Logs	p.183:	7, 11, 27, 31, 33, 37, 39, 53, 89, 95
	3.9	Inverse Trigonometric Functions	p.189:	5, 9, 11, 17, 25, 29, 39, 43, 45
9	3.10	Related rates	p.196:	7, 11, 13, 15, 17, 21, 23, 27, 33, 39
	3.11	Linearization and Differentials	p.209:	5, 11, 17, 19, 23, 33, 39, 45, 49, 59
10	4.5	Indeterminate forms, L'Hôpital's Rule	p.262:	9, 11, 15, 17, 21, 43, 47, 53, 61, 63
	4.1	Extreme Values of Functions	p.227:	5, 17, 23, 31, 37, 39, 53, 63, 69
	4.3	Monotonic Functions	p.241	5, 7, 19, 27, 29, 54, 57, 61

11	4.4 4.6	Concavity and Curve Sketching Applied Optimization	p.251: p.269:	5, 9, 13, 17, 31, 37, 43, 81, 85, 99 3, 5, 7, 9, 11, 13, 15, 19, 29, 37, 41
12		**REVIEW**		

Student Services

You may wish to access the many services available to you as a Concordia student. An overview of these resources can be found here: https://www.concordia.ca/students/services.html

Academic Integrity and the Academic Code of Conduct

This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: https://www.concordia.ca/conduct/academic-integrity.html" *[Undergraduate Calendar, Sec 17.10.2]*

Behaviour

All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the Code of Rights and Responsibilities which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in university activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Intellectual Property

Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities. As specified in the Policy on Intellectual Property, the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Use of Concordia email

Your Concordia email is the official channel for all university communications, as required by the university's Policy on Concordia email accounts for students and employees. Please use your Concordia email for all communication related to this course and check it regularly so you don't miss important information. Learn more about how to access your Concordia email.

As a student, you are expected to follow the email policy and to use your Concordia email in a respectful and responsible manner. The policy helps ensure that communication across the university is secure, reliable, and consistent.

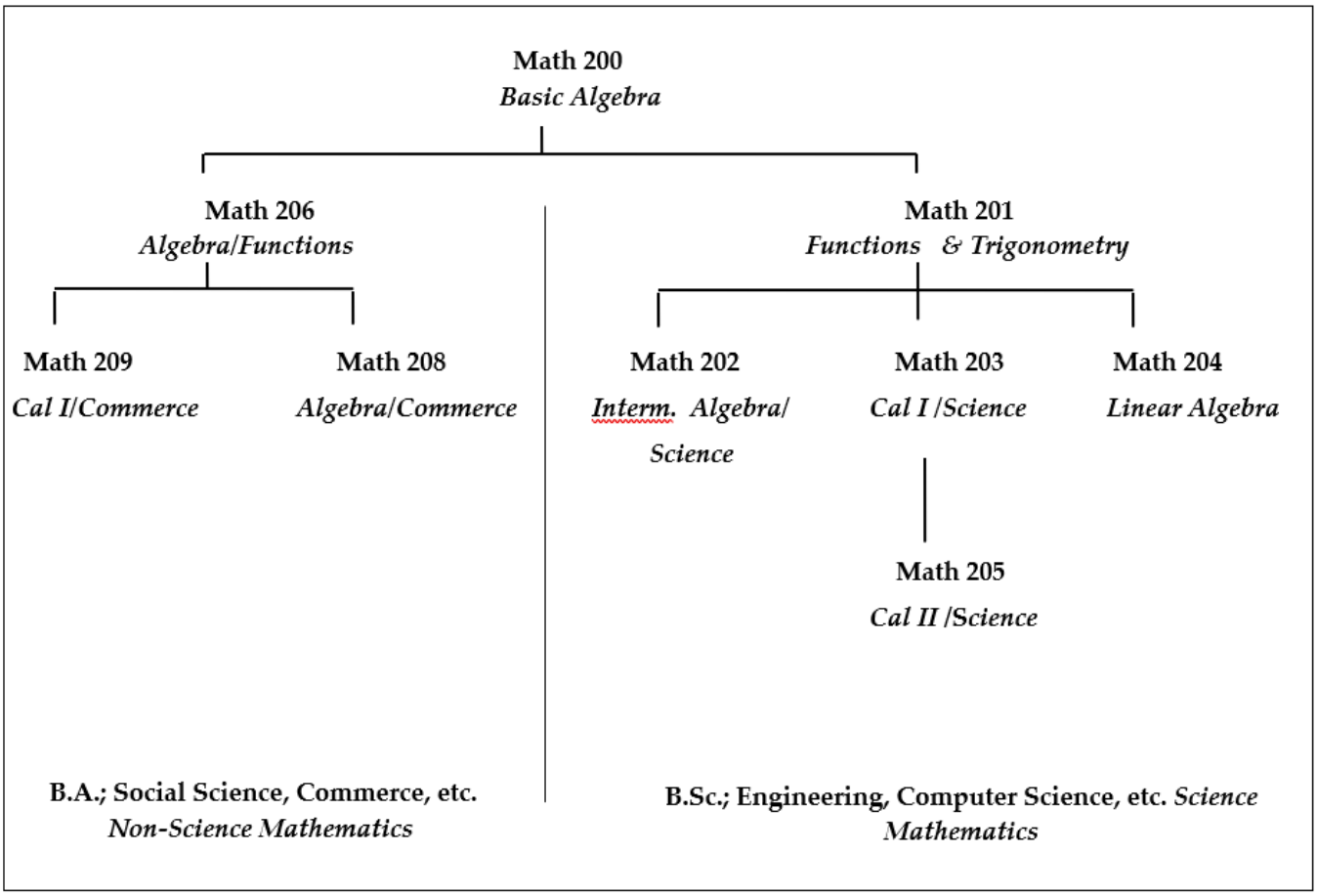
Extraordinary circumstances

In the event of extraordinary circumstances and pursuant to the Academic Regulations the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.

Choosing Between Math 201 and Math 203

If the last math course you took was at the high school level (Quebec), and more than five years have passed since, you should probably register for Math 200. If you are still unsure of your level, read on.

Math Courses at Concordia



A self-administered test to help you decide between Math 201 and Math 203 follows. Give yourself about 30 minutes to complete the test. Be honest with yourself, since registering in the wrong course may cost you money and result in a poor grade. Remember that all university-level courses usually demand quite a bit of your time. Students in Math 203 will find they will not have time once the course begins to review material that they are expected to know before they enter the course.

Scoring: 10 or less = Math 201 is highly recommended; 11-14 = see an advisor; 15 or better = Math 203.

MATH 203

Qualifying Test

(***Answers are on the last page***)

1) What is the equation, in *slope⊚ intercept* form, of the line whose slope is 7 and whose *y⊚ intercept* is ⊚3?

a) $y = \odot 3x + 7$ b) $y = 7x \odot \odot 3$
c) $y = 7x + 21$ d) $y = 7x \odot 21$
e) $y = \odot 7x + 3$

2) What is the slope of any line *parallel* to the line $5x + 6y = 30$?

a) $-\frac{6}{5}$ b) $-\frac{5}{6}$ c) 0 d) $\frac{5}{6}$ e) $\frac{6}{5}$

3) The lines $\odot 4x + 5y = \odot 10$ and $5x + ky = 12$ are perpendicular. What is the value of k?

a) ⊚5 b) ⊚4 c) 4 d) 5 e) 10

4) Find the coordinates of the *midpoint M*, and the *length L* of the line segment joining the points (3, ⊚2) and (4, ⊚1). Answer in simple radical form.

a) $M\left(\frac{7}{2}, -\frac{3}{2}\right),\ L = \sqrt{2}$ b) $M\left(\frac{7}{2}, \frac{3}{2}\right),\ L = \sqrt{3}$ c) $M\left(\frac{1}{2}, -\frac{1}{2}\right),\ L = \sqrt{2}$

d) $M\left(-\frac{1}{2}, \frac{1}{2}\right),\ L = \sqrt{2}$ e) $M\left(\frac{1}{2}, -\frac{1}{2}\right),\ L = \sqrt{3}$

5) What is the equation of the line having a slope of 0 and passing through the point (⊚6, ⊚1)?

a) $x = \odot 6$ b) $x = \odot 1$ c) $y = \odot 6$
d) $y = \odot 1$ e) $y = \frac{1}{6}$

6) Factor: $2x^2 + 11x + 15$

a) $(2x+3)(x+5)$ b) $(x+3)(x+5)$ c) $(2x+15)(x+1)$
d) $(2x+5)(x+3)$ e) $(2x+1)(x+15)$

7) The expression $x^2 \odot 10kx + R$ is a perfect square. Find the value of R.

a) 25 b) $5k^2$ c) $25k^2$
d) $100k^2$ e) $25k^2x^2$

8) Consider solving $x^2 + 12x + 5 = 0$ by completing the square: $x^2 + 12x +$ ____ = ⊜5 + ____
What is the number that goes in the blanks?

a) 144 b) 36 c) 16 d) ⊜16 e) ⊜36

9) Solve $3x^2 ⊜ 5x ⊜ 1 = 0$ using the Quadratic Formula.

a) $\frac{-10 \pm \sqrt{101}}{3}$ b) $\frac{-5 \pm \sqrt{37}}{6}$ c) $\frac{5 \pm \sqrt{37}}{6}$

d) $\frac{10 \pm \sqrt{101}}{9}$ e) $\frac{10 \pm \sqrt{101}}{3}$

10) The graph of the parabola $y = x^2 + 6x + 13$ is symmetric about a line. What is the equation of that line?

a) $x = ⊜3$ b) $x = 0$ c) $x = 3$
d) $y = 0$ e) $y = 3$

11) What is the equation of the circle centered at (4, ⊜5) with a radius of 16?

a) $(x + 4)^2 + (y ⊜ 5)^2 = 16$ b) $(x ⊜ 4)^2 + (y + 5)^2 = 4$
c) $(x + 4)^2 + (y ⊜ 5)^2 = 256$ d) $(x ⊜ 4)^2 + (y + 5)^2 = 256$
e) $(x + 4)^2 + (y ⊜ 5)^2 = 4$

12) Determine which of the following triangles are right triangles if the sides' lengths are:
I) 8, 15, 17 II) 4, 5, 6 III) 2, 2, 3 IV) 9, 12, 15

a) I only b) II only c) III only d) I and IV only e) I, II and IV

13) A triangle ABC has right angle B. Sides AB and BC have the lengths 3 and 4 respectively. Determine the cosine of angle A ($\cos A$).

a) $\frac{3}{5}$ b) $\frac{3}{4}$ c) $\frac{4}{5}$ d) $\frac{4}{3}$ e) $\frac{5}{3}$

14) Which of the following ratios is the tangent of an angle?

a) $\frac{\text{opposite}}{\text{hypotenuse}}$ b) $\frac{\text{hypotenuse}}{\text{adjacent}}$ c) $\frac{\text{adjacent}}{\text{hypotenuse}}$

d) $\frac{\text{hypotenuse}}{\text{opposite}}$ e) $\frac{\text{opposite}}{\text{adjacent}}$

15) What is the value of $\sin\frac{2\pi}{3}$?

a) $\frac{1}{2}$ b) $-\frac{1}{2}$ c) $\frac{\sqrt{3}}{2}$ d) $\frac{-\sqrt{3}}{2}$ e) $\frac{\sqrt{2}}{2}$

16) What is the value of $\cot\frac{3\pi}{2}$?

a) 0 b) 1 c) −1 d) $\frac{\sqrt{2}}{2}$ e) does not exist

17) What is the value of $\log_2 64$?

a) 6 b) 8 c) 16 d) 128 e) 4096

18) Which of the following is equal to $\log_k A = \frac{3}{2}$?

a) $k = \sqrt[3]{A}$ b) $k = \left(\frac{3}{2}\right)^A$ c) $\frac{3}{2} = \sqrt[k]{A}$ d) $A = \sqrt[k]{\frac{3}{2}}$ e) $A = \sqrt{k^3}$

19) Write as a single logarithm: $\log_8 5 - 2\log_8 6$

a) $\log_8 \frac{5}{36}$ b) $\log_8 \frac{5}{12}$ c) $\log_8 11$ d) $\log_8 41$ e) $\log_8 180$

20) What is the result when $\log \frac{AB}{\sqrt{C}}$ is expanded?

a) $\log A + \frac{1}{2}(\log B - \log C)$ b) $\frac{1}{2}(\log A + \log B - \log C)$

c) $\log A + \log B - 2\log C$ d) $\frac{1}{2}(\log A \log B - \log C)$

e) $\log A + \log B - \frac{1}{2}\log C$

ANSWERS: 1. b); 2. b); 3. c); 4. a); 5. d); 6. d); 7. c); 8. b); 9. c); 10. a); 11. d); 12. d); 13. a); 14. e); 15. c); 16. a); 17. a); 18. e); 19. a); 20. e)