

MATH 201
Elementary Functions
Winter 2021

Instructor*: _____

Email: _____

Office Hours: _____

*Students should get the above information from their instructor during class time. The instructor is the person to contact should there be any questions about the course.

Preface: Due to exceptional circumstances, this course will be taught and all assessments will be done completely ONLINE. Given the subject matter and nature of this course, **the midterm and the final exams will be given online through the Concordia Online Exams (COLE) platform with online proctoring.** For more details see the ADDENDUM at the end of this Course Outline

Textbook: *Precalculus Essentials*, by J. Ratti and M. McWaters; Pearson Education. Options with or without the loose-leaf text (E-book only, including in MyLabMath) can be ordered. The textbook will be available at:
<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.

Office Hours: Your professor will announce his office hours during which he will be also 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.

Tutorials: The material in this course requires a lot of practice. The Department has therefore organized special ONLINE tutorial sessions conducted every week to provide additional support to students outside the online lecture environment. These sessions are conducted by tutors who will help with solving problems on the topics learned in class that week, with particular emphasis on the material that students may have difficulties with in this course. Students are strongly encouraged to participate and be active at these problem-solving classes. Tutorials are an important resource to help students succeed in this course.

Math Help Centre: In addition to Tutorials, a Math Help Centre staffed by graduate students is available. The schedule of its operation will be posted on the Department webpage:
<https://www.concordia.ca/artsci/math-stats/services/math-help-centre.html>.

WebWork: Every student will be given access to an online system called **WebWork**. The system provides you with many exercises and practice problems. Students will use this system to do online assignments (see **Assignments** below). In addition, before the midterm test and before the final exam, a number of practice problems will be posted in **WebWork** to help you review the material of the course.

MyLab Math: Every student who purchases 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, typical examples on different topics, often with solutions, video materials, etc., that help you master the course material.

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

Midterm Test: There will be one **midterm test**, based on the material of weeks 1-6, which will contribute up to 35% to your final grade (see the **Grading Scheme** below). The test will be **common** for all sections of this course and will be held on **Sunday March 14, 2021, at 2:30 P.M.** Students who will not be able to write the test that day for a valid reason, e.g. religious (to be reported to the section's **instructor** in advance) or illness (*a valid medical note required*), may write an alternate midterm test on **Saturday March 20, 2021, at 10:00 A.M.**

NOTE: It is the Department's policy that tests missed for any reason, including illness, cannot be made up. If you miss both the main and the alternate midterm tests for a valid reason supported by appropriate documentation, the final exam will count for 90% of your final grade, and the assignments will count for the remaining 10%.

Travel arrangements are not considered a valid reason for missing the midterm test.

Final Exam: The final examination will be online two hours long and will cover all the material in the course.

NOTE: Students are responsible for finding out the date and time of the final exams once the schedule is posted by the Examinations Office. Conflicts or problems with the scheduling of the final exam must be reported directly to the Examinations Office, not to your instructor.

Grading Scheme: The final grade will be based on the higher of (a) or (b) below:
a) 10% for the assignments, 35% for the midterm test, 55% for the final exam.
b) 10% for the assignments, 15% for the midterm test, 75% for the final exam.

NOTE: If the midterm test was missed because of a valid reason the final exam will contribute 90% to your grade and 10% will be contributed by the assignments.

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

CONTENTS

Week	Sections	Recommended Problems		
1	1.1	Graphs of Equations	p. 62	# 5,7,9,17,23,27, 37,55,59,61,69
	1.2	Lines	p. 74	# 3, 5, 17, 23,29, 31, 53, 55, 65
2	1.3	Functions	p. 90	# 11, 17, 25, 27, 33, 35, 63, 69
	1.4	A Library of Functions	p. 106	# 9, 17, 19, 29, 31, 47, 51, 57
	1.5	Transformations of Functions	p. 121	# 3, 5, 11, 19, 33, 51, 63, 67
3	1.6	Combining Functions, Composite Functions	p. 132	# 5, 9, 11, 29, 31, 43, 47, 49
	1.7	Inverse Functions	p. 144	# 13, 21, 23, 27, 37, 43, 45
4	2.1	Quadratic functions	p. 161	# 7, 9, 17, 21, 29, 45, 47, 61
	2.5	Rational Functions	p. 211	# 5, 19, 21, 25, 29, 33, 39, 51, 61
5	3.1	Exponential Functions	p. 235	# 5, 9, 13, 23, 31, 47, 51, 53
	3.2	Logarithmic Functions	p. 250	# 13, 23, 31, 37, 45, 53, 59, 93
6	3.3	Rules of Logarithms	p. 262	# 15, 23, 29, 35, 47, 51, 55, 71, 75
	3.4	Exponential and Logarithmic Equations	p. 273	# 5, 17, 21, 25, 29, 35, 47, 57, 59
7	Pre-midterm Review (time permitting)			
	4.1	Angles and Their Measure	p. 290	# 13,15,23,25,45,51,57,63,65,69
8	4.2	The Unit Circle, Trigonometric Functions	p. 307	# 3, 11, 27, 31,37, 57, 67, 75
	4.3	Graphs of the Sine and Cosine Functions	p. 325	# 13, 17, 23, 25, 33, 37, 41, 43
9	4.5	Inverse Trigonometric Functions	p. 348	# 9,15, 17,25, 35, 55, 59, 61, 71
	4.6	Right Triangle Trigonometry	p. 358	# 13, 17, 21,31, 35, 39, 41, 47, 53
10	4.7	Trigonometric Identity	p. 370	# 3, 15, 19, 27, 33, 41, 45, 71, 73
	4.8	Sum and Difference Formulas	p.385	# 1, 3, 13, 21, 29, 33, 41, 45, 51
11	5.1	The Law of Sine and the Law of Cosines	p. 407	# 1, 5, 7, 17,23, 27, 31, 49, 61, 65
12	5.2	Areas of Polygons and Trigonometry	p. 416	# 3, 5, 11, 13,23, 29, 33, 35
13	REVIEW of the course			

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: concordia.ca/students/academic-integrity." [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.

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.

Addendum:

This course will be taught and all assessments will be completely online. A midterm and/or a final online exam will be provided through the Concordia Online Exams (COLE) platform with online proctoring (also known as auto-proctoring). More information about the COLE system may be found at the [COLE website](#). Additionally, an **online proctoring tool called Proctorio** will be used to provide proctoring during the exam.

Please note the following with respect to online proctored exams:

- That the exam will take place during the exam period at the designated date and time set by the professor (midterm) or the Exams office (final). All exam times will be set to Eastern Standard/Daylight Time.
- That your image, voice and screen activity will be recorded throughout the duration of the exam.
- That you must show your Concordia University Identification card to validate your identity. Alternative government-issued photo identification will be accepted, though it is not recommended. Only identification in English or French will be accepted.
- That any recording made will only be viewed by authorized university personnel (no external entity has authorization to review the recording).
- That you will be responsible for ensuring appropriate, properly functioning technology (webcam, a microphone, appropriate browser and an ability to download any necessary software, as well as a reliable internet connection with a minimum of a 3G connection).
- That you are very **strongly recommended** to enter the virtual test site found at the [COLE website](#) and become familiar with the software that will be used for your exam before starting the exam.
- That you will need a quiet place within which to take the exam. Earplugs or noise-cancelling headphones that are not connected to a device may also be used to allow you to focus for the duration of the exam.

Students who are unable to write an exam because they are unable to meet the above conditions and requirements are advised that they will need to drop the course. More information can be provided on the next offering of this course by consulting the Department. Students are advised that the drop deadline (DNE) for this course is **January 26, 2021**.

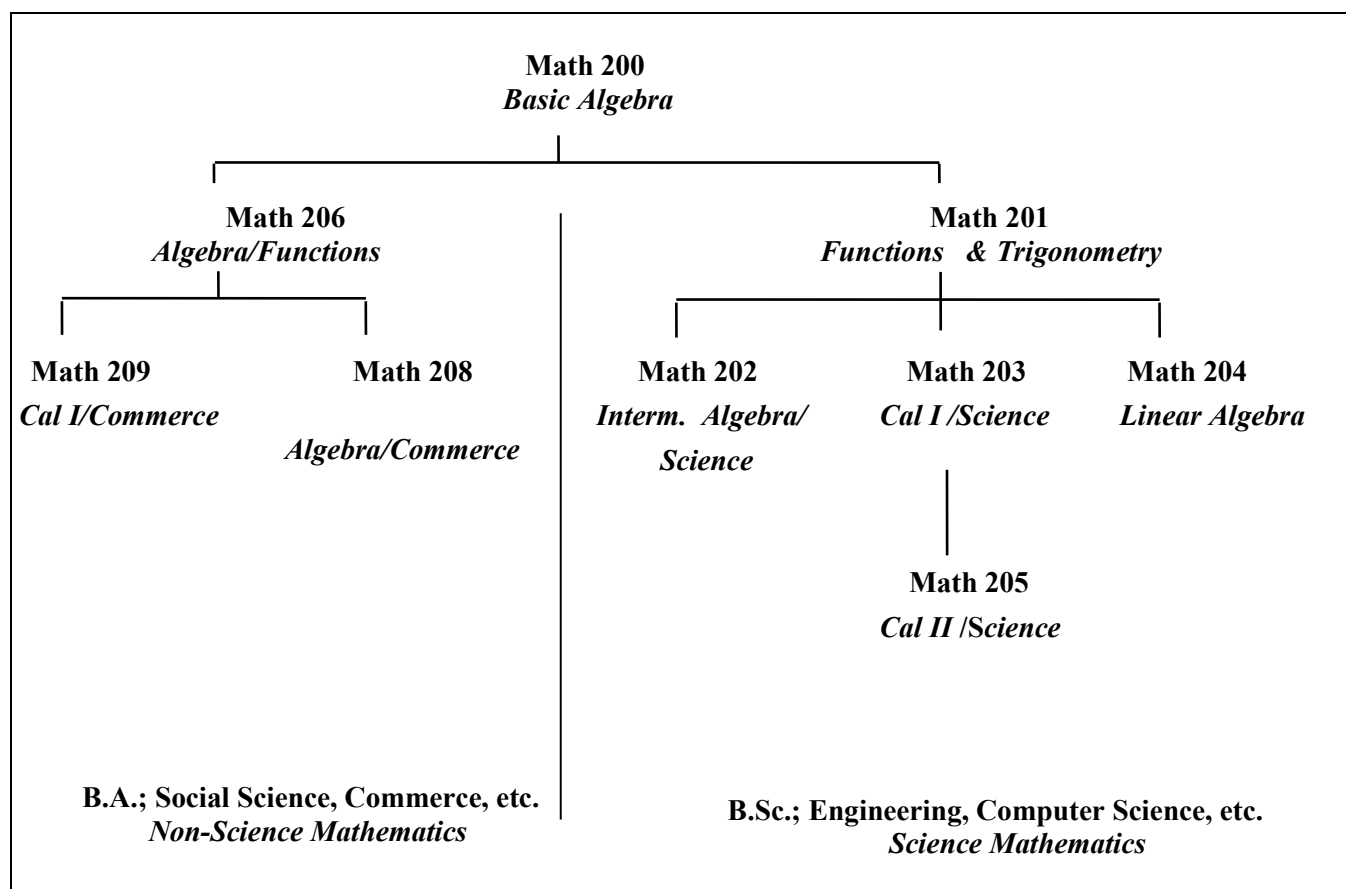
Students who require additional accommodations for their exams due to a documented disability should contact the Access Centre for Students with Disabilities as soon as possible (acsinfo@concordia.ca).

If you face issues during the exam, you should inform your professor of those issues immediately. Please note that there are in-exam supports you should spend time getting to know. [Visit the COLE website](#) for more information.

Choosing Between Math 200 and Math 201

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 200 and Math 201 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 201 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.

Help: The Math Department runs a drop-in **Math Help Centre** in **LB 912** - call the Department's office for further information at 848-2424, Ext. 3222/3223.

Scoring: 15 or less = Math 200; 16-21 = see an advisor; 22 or better = Math 201.

**MATH 201
Qualifying Test**

Part One

- 1) The sum of $3x^2 + x - 7$ and $x^2 + 10$ can be expressed as
 - a) $4x^2 + x - 3$
 - b) $3x^2 + x + 3$
 - c) $4x^4 + x - 3$
 - d) $4x^2 + x + 3$
- 2) The product of $(-3xy^2)(5x^2y^3)$ is:
 - a) $-8x^3y^5$
 - b) $-15x^3y^5$
 - c) $-15x^2y^5$
 - d) $-15x^3y^6$
- 3) Expressed as a single fraction in lowest terms, the sum of $\frac{3x}{4}$ and $\frac{2x}{3}$ is equivalent to:
 - a) $\frac{5x}{7}$
 - b) $\frac{5x}{12}$
 - c) $\frac{17x}{7}$
 - d) $\frac{17x}{12}$
- 4) If $15x^6y$ is divided by $-3x^3$, the quotient is:
 - a) $-5x^2$
 - b) $-5x^3y$
 - c) $5x^2$
 - d) $5x^3y$
- 5) Written in factored form, the binomial $a^2b - ab^2$ is equivalent to:
 - a) $ab(a - b)$
 - b) $(a - b)(a + b)$
 - c) $a^2(b - b^2)$
 - d) $a^2b^2(b - a)$
- 6) The solution set for $2x^2 - 7x - 4 = 0$ is:
 - a) $\{2, 1\}$
 - b) $\{-\frac{1}{2}, 4\}$
 - c) $\{-2, 1\}$
 - d) $\{\frac{1}{2}, -4\}$
- 7) What is the solution for the following system of equations?
 $2x + y = 7$
 $x - 2y = 6$
 - a) $\{3, 1\}$
 - b) $\{1, 3\}$
 - c) $\{-1, 4\}$
 - d) $\{4, -1\}$
- 8) The sum of $\sqrt{12}$ and $5\sqrt{3}$ is:
 - a) $10\sqrt{3}$
 - b) $7\sqrt{6}$
 - c) $7\sqrt{3}$
 - d) 360
- 9) The graph of the line passing through the points (6, 7) and (4, 2) has a slope of:
 - a) $\frac{2}{5}$
 - b) $-\frac{5}{2}$
 - c) $\frac{5}{2}$
 - d) $-\frac{1}{2}$

10) The graph of the equation $y = 3$ is a line:

- a) parallel to the x-axis b) parallel to the y axis
c) passing through the points (6, 7) d) passing through the point (3, 0)

11) Which equation represents a line whose slope is $\frac{1}{2}$ and whose y-intercept is 3?

- a) $y = \frac{1}{2}x - 3$ b) $y = -\frac{1}{2}x + 3$ c) $y = 3x + \frac{1}{2}$ d) $y = \frac{1}{2}x + 3$

12) The inequality $3x + 2 > x + 8$ is equivalent to:

- a) $x > -\frac{3}{2}$ b) $x > \frac{3}{2}$ c) $x > 3$ d) $x < 3$

13) The smallest whole number that satisfies the inequality $3x - 1 > 2$ is:

- a) 1 b) 2 c) 3 d) 0

14) If x is an integer, what is the solution set of $3 < x \leq 6$?

- a) {3, 4, 5} b) {4, 5, 6} c) {3, 4, 5, 6} d) {4, 5}

15) The lengths of sides of a triangle are 8, 15, and 17. If the longest side of a similar triangle is 51, what is the length of the shortest side?

- a) 32 b) 24 c) 16 d) 4

16. If two legs of a right triangle are 5 and 12, the hypotenuse is:

- a) $\sqrt{119}$ b) $\sqrt{17}$ c) 17 d) 13

17) What is the circumference of a circle whose radius is 6?

- a) 6π b) 12π c) 36π d) 3π

18) Maria is twice as old as Sue. If x represents Sue's age, which expression represents how old Maria will be in three years?

- a) $2x$ b) $x + 3$ c) $\frac{1}{2}x - 3$ d) $2x + 3$

Part Two

- 1) Simplify: $(2w^3 - 5w - 15) - (-6w^2 + w - 15) + (4w^2 - 7)$
- 2) Evaluate: $-r - [-p - (-n + r)]$ for $n = -3$, $p = 4$ and $r = -1$
- 3) Simplify: $\frac{1}{3^{-1} - 4^{-1}}$
- 4) Perform the indicated operations: $-\frac{1}{6} + \frac{11}{14}$
- 5) Factor completely: $3x^2 - 15x - 42$
- 6) Perform the indicated operations and express in simplest form: $\frac{x^2 - 16}{x^2 - x - 20} \cdot \frac{1}{x - 4}$
- 7) Perform the indicated operations: $3\sqrt{96} + 6\sqrt{54} - 2\sqrt{150}$
- 8) Express $\frac{3}{\sqrt{5} + 1}$ as an equivalent fraction with a rational denominator.
- 9) Solve: $-14 - 6a < -74$
- 10) Find a positive number whose square is 12 more than the number itself.
- 11) Solve $x + 5 = 3y - 2$
 $2x + 7 = y + 3$
- 12) In a class of 24 students, 25% of them failed a test. How many students failed the test?

ANSWERS

Part One:

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

Part Two:

1. $2w^3 + 10w^2 - 6w - 15 - 7$; 2. 7; 3. 12; 4. $\frac{13}{21}$; 5. $3(x - 7)(x + 2)$; 6. $\frac{1}{x - 5}$; 7. $20\sqrt{6}$; 8. $\frac{3(\sqrt{5} - 1)}{4}$; 9. $a > 10$; 10. 4;
11. $(-1; 2)$; 12. 6.