MATH 101: INTEGRAL CALCULUS WITH APPLICATIONS

The University of British Columbia
2023 WT2

ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xʷməθkʷəy̓əm (Musqueam). The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on culture, history, and traditions from one generation to the next.

If you would like to know more about the joint history of UBC and Musqueam, one place to start is at UBC's Indigenous portal.

COURSE DESCRIPTION

Course Title	**Course Code Number**	**Credit Value**
Integral Calculus with Applications	MATH 101	3

MATH 101 involves both topics from integral calculus as well as multi-variable calculus. Students will learn the basic ideas, tools and techniques that they can use to solve problems with real-life applications.

Enrolment in this course requires a passing grade in one of MATH 100, MATH 110, MATH 120, MATH 180.

CONTACTS

Do not email your instructor directly with questions, there are many people contributing to the delivery of this course and they can be reached via different channels. Your issue will be resolved more quickly if it is directed to the correct communication channel, a brief list of some of the issues handled by each channel has been provided:

- Instructor office hours - questions related to Written Assignment and Test grading; questions regarding content covered in large and small classes; general math questions.
- Piazza - Questions related to Written Assignment and WeBWorK assignment problems; questions not unique to individual students
- Calculus Contact form - Questions relating to course policy that require personal information; requests for concession, accommodation, or CfA letters of accommodation; requests for Written Assignment and Test regrades (please follow instructions in the Regrades section).

The calculus contact form can be found on Canvas or here.

For instructor office hours, please see Canvas → Sections.

The large class instructors for this course are as follows:

MATH 101A	MATH 101B	MATH 101C
Dr. Philip Loewen Dr. Nahid Walji Dr. Pablo Schmerkin	Dr. Seçkin Demirbaş Dr. Stephen Gustafson	Dr. Elyse Yeager Dr. Mark Mac Lean

COURSE STRUCTURE

There are three "flavours" of MATH 101, each with different applications.
Flavour "A" includes applications to Physical Sciences and Engineering.
Flavour "B" includes applications to Biology and Life Sciences.
Flavour "C" includes applications to Commerce and Social Sciences.
All flavours share similar homework and exams, and each large class will learn the same material. The instructors coordinate to teach roughly the same topics at roughly the same time. The differences are in the small classes, where each section may be taught examples of applications for their respective flavours.

Most weeks, you will attend one 2-hour lecture taught by a large class instructor, and one 1-hour small class taught by a small class instructor and TA. There will be group work during small classes, attendance is mandatory.

This is an in-person course, all students are expected to be present on campus for their registered small classes, large classes, and final exams. Large class section 2AR is an exception to this rule, and is delivered online; students enrolled in this section must still attend their small classes and final exam in person.

LEARNING MATERIALS AND TEXTBOOKS

Our course materials are linked to UBC's learning management system, Canvas.

This course uses the CLP-2 Integral Calculus textbook. You can find a book of practice problems in the second link on the same page. This is a free online textbook created by UBC professors for UBC students; there are no physical copies available but the PDF file is easily printable (given the link, copy shops will print and bind).

You may want to use Optimal, Integral, Likely as a resource for the probability concepts we talk about. Do note that this textbook is not as thoroughly de-bugged as CLP; where they differ, use CLP as the authority.

Students are expected to have regular access to a computer and the internet, WeBWorK assignments and Written Assignments will be submitted via Canvas or WeBWorK. Assignments submitted via other means, i.e. email, will not be accepted.

LEARNING OUTCOMES

Throughout this course you will learn and be required to reliably demonstrate new skills.
The skills listed below are organised by the class/homework they are introduced, and are subject to change throughout the semester:

Week 1 -

(a) Interpret the definite integral $\int_a^b f(x), \mathrm{d}x$ as signed area when $a < b$.

(b) Understand what an area function of the form $\int_a^x f(t)\,\mathrm{d}t$ is, and compute them for simple functions using geometry

(c) Understand that the areas of curved shapes can be approximated by cutting up those shapes in to many small rectangles and/or triangles.

(d) Evaluate certain definite integrals using geometry and the interpretation of definite integral as "area under the curve."

(e) Given a function, sketch the area function $A(x)$.

(f) Explain using a picture how to approximate area using left or right Riemann sums concretely for a small number of rectangles.

(g) Explain the Trapezoidal rule for approximating areas.

(h) Find approximations of areas using the Trapezoidal rule.

(i) Understand why the definite integral sometimes has a negative value, even though areas cannot be negative.

(j) Given a function, sketch the area function $A(x)$. (Review from large class.)

(k) Produce a compelling argument that $A(x) = \int_a^x f(t)\ dt$ should satisfy $A'(x) = f(x)$ if f is continuous at x; illustrate what can go wrong if f has a simple jump discontinuity at x.

(l) State the fundamental theorem of calculus part 1.

(m) Use the fundamental theorem of calculus part 1 to differentiate a function defined as a definite integral (area function).

(n) Understand how to interpret sigma notation. (This is review from high school.)

- Express sums using sigma notation.
- Manipulate sums using arithmetic properties: constant sums, factoring and addition.

Week 2 -

(a) Explain using pictures, words, equations, and inequalities, the arithmetic of integrals as well as properties involving the endpoints a and b.

(b) Define the indefinite integral and explain how it differs from the definite integral.

(c) Use FTC1 to prove FTC2

(d) Use the fundamental theorem of calculus part 2 to compute definite integrals.

(e) Explain why anti-derivatives are non unique.

(f) Find anti-derivatives of basic functions by inspection, in particular, those important integrals listed in CLP-2 Theorem 1.3.16.

(g) Find anti-derivatives of composite functions like $\sin(2x - 1)$, whose general form is $f \circ \ell$ with $\ell(x) = mx + c$ and $f(x)$ selected from the table just mentioned (CLP-2 Theorem 1.3.16).

(h) Solve applied problems expressed in prose by selecting and carrying out steps involving integration-related ideas and skills, such as approximation by rectangles or trapezoids, antiderivatives, the fundamental theorem of calculus, etc.

(i) Combine FTC1 with the Chain Rule and properties of integrals to derive and/or apply Leibniz's Rule, namely, $\frac{d}{dx}\int_{a(x)}^{b(x)} f(t)\,dt = f(b(x))b'(x) - f(a(x))a'(x)$.

Week 3 -
(a) Explain how the chain rule for derivatives corresponds to the substitution method for antiderivatives.
(b) Use a given substitution to evaluate an indefinite integral.
(c) Show how a given substitution affects the bounds of integration when used with a definite integral.
(d) Recognize when a substitution will simplify a given integral (definite or indefinite), and determine the form of an effective substitution.
(e) Compute integrals where the integrand requires manipulation to reveal an effective substitution.
(f) Compute integrals using a sequence of substitutions. E.g., $\int \sin^2(x^2)\cos(x^2)[2x]\,dx$.
(g) Compute indefinite integrals of the form $\int \sin^m x \cos^n\,dx$ when one of the exponents m or n is odd.
(h) Compute indefinite integrals of the form $\int \sin^m x \cos^n\,dx$ when both exponents m or n are even. (Allow $m = 0$ or $n = 0$.)
(i) Use standard identities, including the definitions of different trigonometric functions, to simplify trigonometric integrals. Here the "standard identities" are
- $\sin^2 x + \cos^2 x = 1$,
- $\sin^2 x = \frac{1}{2}(1 - \cos(2x))$,
- $\cos^2 x = \frac{1}{2}(1 + \cos(2x))$,
- $\sin(2x) = 2\sin x \cos x$,
- $\tan(x) = \sin(x)/\cos(x)$, $\sec(x) = 1/\cos(x)$
- $\cot(x) = 1/\tan(x)$, $\csc(x) = 1/\sin(x)$.

Week 4 -
(a) Describe the similarities and differences between direct substitution (let $u = \phi(x)$) and inverse substitution (let $x = \psi(u)$).
(b) Recognize when a trigonometric substitution is an effective means of computing an integral.
(c) Identify which trig substitution is best and which trig identities are required in the situation above. Key identities to remember: $\sin^2 x+\cos^2 x = 1$, $\tan^2 x+1 = \sec^2 x$, and $\sec^2 x-1 = \tan^2 x$.
(d) Compute antiderivatives using trig substitution, presenting the answer in terms of the same variable used to state the question.
(e) Partial Fractions: Express a given function of the form $f(x) = \frac{p(x)}{q(x)}$ as a sum of terms with the general form $1/(m_k x + c_k)$, and thereby find its antiderivative. Assume p and q are polynomials, where q can be factored into distinct linear terms and the degree of p is less than the degree of q.
(f) Represent the volume of a 3D object as a definite integral. Explain using a picture what each piece of the integral represents.
(g) Find the volume of a given surface of revolution using disks.
(h) Find volume by integrating over cross sectional areas.

Week 5 -
(a) Explain how the product rule for derivatives corresponds to integration by parts for integrals.
(b) Use integration by parts to compute definite and indefinite integrals.
(c) Identify when integration by parts is an appropriate method to use.

(d) While performing integration by parts, identify which portion of the integral should be "u" and which part should be "dv." This includes the case where dv is simply dx.

Week 6 - (a) Recognize some functions for which no elementary antiderivative exists: e^{x^2}, $\sin(x^2)$, $\cos(x^2)$.

(b) Explain why the expression $\int_0^1 e^{-x^2}\,dx$ is a well-defined number in spite of the fact above.

(c) Approximate a definite integral using the trapezoidal rule. (This already appeared in Week 1.)

(d) Approximate a definite integral using Simpson's rule. Explain why the number of subintervals involved must be *even.*

(e) Explain why Simpson's rule usually produces a more accurate approximation than the Trapezoidal Rule or a Riemann sum, for the same number of function evaluations.

(f) Given the true value of an integral, compute the error and relative error in a numerical approximation.

(g) Given a definite integral and a number of subintervals, use derivative information to find a worst-case estimate of the absolute error in the approximations produced by the Trapezoidal Rule or Simpson's Rule.

(h) Given a definite integral and a specified tolerance, use derivative information to find the number of subintervals required to produce an approximate value whose absolute error is less than the given tolerance, for the Trapezoidal Rule and/or for Simpson's Rule.

(i) Compare error estimates with true error using a spreadsheet

(j) Use numerical integration to compute approximations to definite integrals where the function is not defined explicitly or where the indefinite integral cannot be represented using standard functions.

Week 7 - (a) Check whether a given function satisfies a given ordinary differential equation, or ODE. (Review of MATH 100.)

(b) Decide when a given first-order ODE is separable.

(c) Find the general form of the solution for a given separable ODE.

(d) Given a separable ODE and a point, find a solution of the ODE whose graph includes the given point. (That is, solve the initial value problem.)

(e) Show how separable-ODE methods produce the general solution for ODE's of the form $y' = my + c$, where m and c are constants. Compare with the methods used in MATH 100.

(f) Use real-world ideas involving rates of change (like conservation or mass, Newton's Law of Gravitation, or the power of compound interest) to formulate and solve a differential equation describing a problem appropriate to your discipline, such as dilution of solutions, population growth, or mortgages. Use the solution to gain insights into the original application.

(g) Interpret a differential equation in context and use the results to make inferences about the relevant application.

(h) Identify important parameters that affect the qualitative behaviour of solutions. Find the parameter-values where important transitions occur.

Week 8 - (a) State the different ways an integral can be improper.

(b) Define what it means to *evaluate* an improper integral. In particular, explain using a picture, what area is being computed and what limit is being taken.

(c) Define what it means for an improper integral to converge or diverge.

(d) Demonstrate the convergence/divergence of $\int \frac{1}{x^p}\,\mathrm{d}x$ for general $p > 0$, with domains $(0, 1]$ and $[1, \infty)$.

(e) Evaluate an improper integral (or prove it diverges) by explicitly writing and computing the appropriate limit.

(f) Use the comparison test to determine convergence/divergence for improper integrals without finding their antiderivatives.

(g) Use the limit comparison test to determine convergence/divergence of improper integrals without finding their antiderivatives.

(h) Define and explain the terms: probability, event, value.

(i) (Note to instructors, not a learning objective: give an example where it's not reasonable to use a discrete variable, but it is reasonable to ask whether a variable takes a value inside a particular range)

(j) Define Probability Density Function (PDF) as the function $f(t)$ such that $Pr(a \leq X \leq b) = \int_a^b f(t)\,\mathrm{d}t$.

(k) Use a PDF to compute probabilities.

(l) Use that definition to conclude properties of PDFs: $f(t) \geq 0$ and $\int_{-\infty}^{\infty} f(t)\mathrm{d}t = 1$

Week 9 -

(a) Use the properties of PDFs to find unknown parameters in its definition.

(b) Interpret the PDF in terms of relative likelihoods of different regions

(c) Explain what is meant by a "long-term average" and contrast this with the outcome of finitely many experiments.

(d) Define expected value for continuous systems.

(e) Compute the expected value for continuous systems.

(f) For an increasing or decreasing PDF use an intuitive argument to check whether the expected value is more or less than the halfway point of the space.

(g) Define variance and standard deviation

(h) Explain in plain(ish) language what these quantities represent, in reference to their definitions.

(i) Compute standard deviation and variance either using the conventional definition or the alternative formulation: $\mathrm{Var}(X) = \mathbb{E}(X^2) - (\mathbb{E}(X))^2$.

Week 10 -

(a) Define sequences and series, and explain the difference between the two.

(b) Find the limit of a sequence, considering the possible results $\pm\infty$, a number, or DNE.

(c) Define a partial sum.

(d) Explain what it means for a series to converge.

(e) Determine whether a given series is geometric.

(f) Given a geometric series, determine whether it converges or diverges. If it converges, find its sum.

(g) Apply the divergence test to determine the divergence of applicable series.

(h) Explain in words why the divergence test works.

(i) Give an example of a series that diverges, but the divergence test does not detect this.

(j) State the conditions required to apply the integral test.

(k) Explain in words and with a picture why the integral test works.

(l) Use the integral test to to determine convergence or divergence of applicable series. In particular, use the integral test to derive the p-test.

(m) Use the integral test to bracket the tail of a series between two positive numbers; use this chain of inequalities to approximate the sum of a given series.

Week 11 -
(a) State the comparison test for series with positive terms, and explain why it works.
(b) Given a series, decide if the comparison test is appropriate. If so, determine a suitable series to use as a comparison.
(c) Apply the comparison test to determine the convergence or divergence of series.
(d) State the limit comparison test and explain why it follows naturally from the comparison test.
(e) Use the limit comparison test to determine whether a series converges or diverges. Supply good candidate series for comparison.
(f) State the ratio test and explain its connection with geometric series.
(g) Apply the ratio test to series when appropriate. In particular, to series involving factorials and/or exponentials.
(h) State when the ratio test is inconclusive.
(i) Give an examples of a divergent series $\sum a_n$ for which the ratio test is inconclusive.
(j) Give an examples of a convergent series $\sum b_n$ for which the ratio test is inconclusive.
(k) Use the alternating series test to determine convergence of series.
(l) Give a heuristic explanation to justify the alternating series test.
(m) Define both absolute convergence and conditional convergence.
(n) Use absolute convergence to determine the convergence of some series. Explain why "absolute convergence implies conditional convergence" works, but only in the one stated direction.

Week 12 -
(a) Define a power series centred at a point.
(b) Explain what is meant by "the radius of convergence" for a power series.
(c) Compute the radius of convergence of a given power series.
(d) Translate the centre and radius of convergence for a given power series to determine the interior of its interval of convergence.
(e) Perform operations on power series as per CLP-2 Theorem 3.5.13, taking into account the radius of convergence.
(f) Use termwise operations of substitution, differentiation, and integration on known series (for example, the geometric series) to derive power series for related functions (for example, the logarithm).
(g) Define Taylor series and recognize Taylor series of the standard functions in CLP-2 Thm. 3.6.5.
(h) Explain the utility of representing complicated functions $\left(\text{eg. } \arctan x \text{ or } \int_0^x \sin t^2\, \mathrm{d}t\right)$ as power series.
(i) Find Taylor series of common functions via the definition.
(j) Given a power series centred at c that defines a function f, evaluate the derivative $f^{(n)}(c)$ for arbitrary $n \geq 0$.
(k) Use Taylor series to efficiently compute limits which have an indeterminate form.

Week 13 -
(a) Estimate the error in approximating a function by finitely many terms in the series.
(b) Use Taylor series to find a series representation of particular values of functions (eg. $\log(1/2)$ or $\arctan 1$).
(c) Use the error estimation formula for alternating series to establish a bound on your approximation (using finitely many terms from the series).

GRADING AND EVALUATION

Your course grade will be calculated as follows:

10% WeBWorK assignments

10% Written Group Assignments

20% Tests (10% each)

10% Engagement

50% Final exam

For a full description of the final exam regulations, see the UBC Calendar page on Student Conduct during Examinations. Unless specifically stated otherwise, notes, calculators, cell phones and other electronic devices are strictly prohibited from use during the exam. This includes use of cell phones for checking the time.

0.1 WeBWorK: assignments and quizzes

There are 11 WeBWorK assignments. Only your top 10 WeBWorK assignments will be considered when calculating your provisional grade; this is intended to account for technical difficulties, illness, and other personal situations. WeBWorK assignments are due on Fridays. These assignments make up 10% of your initial grade. Only your highest attempt will be counted.

WeBWorK assignments are used to achieve technical and computational mastery.

WeBWork questions come in a number of different formats, and some questions will require you to type out an exact answer in order for the question to be correct. These answers are not always numbers, so making a typo could cost you marks. It is suggested that you click the PREVIEW ANSWERS button before you submit your work. If you have questions about formatting while you are doing your assignments or practicing, ask them on Piazza.

The WeBWorK quiz is not a weighted assessment, it will not contribute to your final grade. The quiz is a 50-minute timed assessment consisting of 25 WeBWorK questions selected from all previous WeBWorK assignments. It is open throughout the year. There is no limit to the number of times you may attempt the quiz. It is recommended that you attempt it at least once per week. You will get a new set of problems each time.

In order to start the quiz, you must enter the access code found on the canvas course page. In order to submit the quiz, you must press the ”Grade Test” button at the bottom of the quiz page. You must do this before the timer at the top of the quiz page reaches 0. Do not press this button before you wish to submit. Pressing the ”Preview” button will save your work up to that moment. Do not open more than one WeBWorK tab while doing the quiz.

0.2 WRITTEN ASSIGNMENTS

There are four written group assignments. They will make up 10% of your initial grade. Group assignments are meant to explore and extend core concepts. Make sure to start early: it is not unusual to spend up to

12 hours on an assignment. Assignments are graded on clarity and coherence as well as correctness. They must be well written and clearly presented.

It is expected and encouraged for your group to work with other groups on these assignments. However, your group must write up its assignment independently, and any ideas inspired by discussions with students outside your group must be acknowledged in your submission.

Collaboration and communication is a part of learning mathematics, as such students are largely expected to resolve group issues themselves, although major group issues can be reported via the Calculus Contact Form, and should be done as early as possible in the semester.

0.3 TESTS

There are two tests in MATH 100, they will both be written individually, not in groups. All information required to successfully sit the tests will be published on the Canvas "Tests" page.

0.4 ENGAGEMENT

Engagement is worth 10% of your final grade.

Small classes: attendance and active participation within small classes comprises half of your engagement grade. Asking questions and contributing to team problem solving are good examples of active participation. You may be absent from one small class without penalty; this is to account for illness and other personal situations.

Reflection questions: The other half of your engagement grade is obtained from a reflective question asked at the start of each written assignment. This question is designed to help you reflect on the learned concepts and your progress within the course; the criteria to this question are not strict but your answer should be thoughtful and demonstrate your efforts to engage with the course material.

Other engagement grades: There may be other opportunities to participate throughout the term. In some cases, failing to complete a engagement task will result in a penalty. However, small class instructors may also give bonus engagement marks (to a maximum of 10 points) for especially productive engagement.

0.5 FINAL EXAM

The final exam is an evaluative assessment of your understanding of the course material. All information required to sit the final exam will be published on Canvas or made available on the SSC later in the semester. One section of the final exam will consist of benchmark questions designed to assess core competencies.
A score of 40% or higher on these benchmark questions is required to pass the course. Students who score lower will earn at most 45% total in the course.

IMPORTANT DATES

MIDTERM EXAMS:

Test 1: TBD

Test 2: TBD

FINAL EXAM:

The final exam date and time will be finalized during the semester and can be accessed via the Student Service Centre (SSC). Please do not make travel arrangements prior to its release.

OTHER DATES

Midterm Break: February 19th - 23rd
Last day to drop without a "W" standing: January 19th
Last day to withdraw with a "W" standing: March 1st

CLASS SCHEDULE

Week	Subject	Sections
1	Area functions and the definite integral; Approximating areas with rectangles and trapezoids; The Fundamental Theorem of Calculus – Part 1	1.1, 1.3
2	Properties of the definite integral; the Fundamental Theorem of Calculus – Part 2	1.2, 1.3
3	Substitution; Trigonometric integrals	1.4, 1.8
4	Trigonometric substitution; partial fractions; Volumes	1.9, 1.10, 1.6
5	Integration by parts	1.7
6	Numerical integration	1.11
7	Separable differential equations	2.4
8	Improper integrals; Intro to probability	1.12 , OIL 4.1
9	Probability density functions; Expected value; Variance; Standard deviation	OIL 4.4, 4.5, 4.6
10	Sequences and series; The integral test	3.1, 3.2, 3.3
11	Comparison tests; The ratio test; Alternating series and absolute convergence	3.3, 3.4
12	Power series; Taylor series	3.5, 3.6
13	Taylor series	3.6

POLICIES AND RESOURCES TO SUPPORT STUDENT SUCCESS

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available here.

Information on general course policies including resources can be found here.

ACADEMIC POLICIES

This is a long-winded and exhaustive description of the academic policies governing this course. It complements the usual academic policies governing all courses at UBC (here).

LATE SUBMISSIONS & MISSED ASSESSMENTS

Written Assignments will be accepted up to 24 hours after the submission deadline, assignments submitted during this window are subject to a 15% penalty. Written Assignments will not be accepted more than 24 hours after the submission deadline. Written Assignments are completed in groups over multiple weeks, if you are unavoidably unable to contribute to your group's written assignment you should inform your group members; if a member of your group is unable to contribute for a valid reason you should not list them as non-contributing.

WeBWorK assignments will not be accepted after the submission deadline. Only the top 10 of the first 11 WeBWorK assignments are considered in the calculation of your final grade, this is to account for illness, injury and other personal circumstances that inevitably befall students every semester preventing you from completing an assignment.

Tests are written in-class. If you are unwell or other personal circumstances create a substantial and unavoidable obstacle in writing the tests, do not write the test, instead request concession via the Calculus Contact Form. If you are absent during a test day for a valid reason, (described in IN-TERM CONCESSIONS) you should submit a request through the Calculus Contact Form.

It should be noted that assignment extensions are not concessions that will be offered in this course. Alternative concessions may be offered, the requisite circumstances are outlined in IN-TERM CONCESSIONS.

IN-TERM CONCESSIONS

Requests for in-term concessions are to be directed to the Calculus Contact Form and will be treated in accordance with the UBC senate rulings for academic concession. Grounds for academic concession may exist when a student's personal circumstance unexpectedly or unavoidably hinders or prevents them from fulfilling the requirements of a course in a timely manner.

Concessions for missed assessments are considered and offered on a case-by-case basis, no two students will be undertaking the academic load of this course in the same way, and as such require different consideration; a friend or fellow class member receiving concession for an assessment does not guarantee the same or any concession will be offered to you.

Requests for concession must be delivered in a reasonable time, unreasonably late requests will be deferred to your governing faculty.

Concessions cannot be offered to students where grounds for concession depend upon long-term conditions (i.e. chronic injuries, illnesses, or mental health conditions, etc.) without endorsement from the student's governing faculty or the Centre for Accessibility (CfA).

Written Assignments in general are not eligible for concession, these are completed in groups and it is expected that members will be able to complete assignments despite absence of contribution from 1-2 other members. Dire circumstances are requisite for receiving concession on Written Assignments, in general do not expect to receive concession for Written Assignments. The standard concession offered for eligible Written Assignments is a shifting of the weight of the Written Assignment to the final exam.

WeBWorK assignments are completed online, and can be completed from anywhere, again dire circumstances are required to receive concession on WeBWorK assignments. The standard concession offered for eligible WeBWorK assignments is a shifting of the weight of the missed WeBWorK assignments to the final exam.

Tests are a major assessment in this course, each worth 10% of your final grade. If you are absent for a valid reason for one test, the standard concession is to shift the weight of that test to the final exam. If you are absent for a valid reason for both tests you will be asked to speak with your governing faculty and consider a late withdrawal; pending faculty endorsement you may be offered additional concessions.

The **Final Exam** for this course is a major assessment, however instructors nor staff in the Math department can grant concession for this assessment. Similarly to the **Tests** if you are unwell or other personal circumstances create a substantial and unavoidable obstacle in writing the final exam, do not write the final exam, instead contact your faculty's advising office as soon as possible. Obtaining a Standing Deferred (SD) status in MATH 101 is the only concession available for the **Final Exam**, read more about standing deferred status here. The process for obtaining an SD status in MATH 101 is more rigorous than for other in-term concessions; be prepared to provide documents supporting your request.

MISSED CLASS POLICY

It is expected you will attend all Large Classes, however if you are absent for a Large Class you do not have to inform anyone of your absence, it is expected that you will be responsible for your own learning and catch up on the material missed in your own time; helpful resources such as lecture notes (or for some sections recordings) are posted on Canvas. You can also attend office hours to help understand any missed material more clearly.

It is expected you will attend all Small Classes, if you are absent for a valid reason you should make a request via the Calculus Contact Form, stating which small class you missed and briefly describing why you were absent. Supporting documents are not required for the first occurrence of illness that are likely to resolve themselves quickly; if it is not the first occurrence or the illness is unlikely to resolve itself quickly concession cannot be provided by instructors or staff, you will be directed to contact your faculty's advising office.

All students can be absent from one small class without consequence, this small class, despite not appearing as 'excused' in the Canvas Gradebook, will not affect your engagement score for this class. This policy of forgiving one absence is intended to ease administrative burden and will be used to account for the first instance of illness, injury or other personal circumstance that prevents you from attending class.

Classes may be cancelled under extreme weather (most commonly heavy snowfall), cancellation will always be announced on Canvas in accordance with weather advisory posted by UBC. You can check official campud notifications here.

REGRADE REQUESTS AND INCORRECT GRADES

Regrade requests should be submitted via the Calculus Contact Form for all assessments except the Final Exam.

Regrade requests for **Written Assignments** can be submitted up to 48 hours after the marked assignment is returned. You should submit a request via the Calculus Contact Form.

Regrade requests for **WeBWorK Assignments** will not be accepted, if an error exists in a WeBWorK question you should check Piazza for a post that describes the error, or if no post exists you should create one describing the error.

The process for requesting a regrade on **Tests** is described on the "Tests" page on Canvas.

Requesting a regrade of the **Final Exam** is a formal process requested via enrolment services, known as a review of assigned standing; a more complete description of the process is provided here. It is recommended that you request a viewing of your final exam prior to requesting a review of assigned standing, to request a viewing of your final exam you can submit a request via the Calculus Contact Form.