

Math 171 – Calculus 1 – Fall 2025 – Sections 1 and 2

Instructor

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Office hours: by appointment

Section 1

8:30am-9:45pm MWF

Blocker Hall 18

Section 2

11:30am-12:45am MWF

Blocker Hall 18

What is calculus? Calculus is the study of quantities changing over time, using the tools of graphical visualization and symbolic algebra. The first two weeks we will focus purely on graphical visualization, before turning to symbolic algebra tools. On the graphical side, we will study curves, tangent lines, how curves bend, and areas enclosed by curves. On the symbolic side, we will study polynomials, exponential functions, logarithms, and trigonometric functions.

Resources: To access online homework, you need *MyLab Math with Pearson eText – 18 Week Access – for Thomas’ Calculus: Early Transcendentals*. The online textbook is a useful reference, but the main source of course content will be notes and study guides posted on Blackboard. A calculator is optional; it may be useful for homework, but you will not have access to one during quizzes and tests.

What will this class be like? The best way to learn math is by doing math, so my goal is to get you doing math during class. Some lecturing is necessary, but you will spend around half of class solving practice problems with an assigned partner. New partners will be assigned regularly.

Mastery-based grading: In this course, your grade depends on how well you eventually understand the course topics. You will have multiple chances to demonstrate proficiency in various skills, and doing poorly on a single quiz doesn't tank your grade. Your final grade is determined by the number of skills and homeworks you complete, using either table below. In the left table, your final grade is the highest line that you meet both requirements for. In the right table, look up your final grade by row and column.

	Skills	HW
A	17	30
A−	16	29
B+	15	28
B	15	26
B−	14	25
C+	13	24
C	13	22
C−	12	21
D+	11	20
D	11	18
D−	10	17

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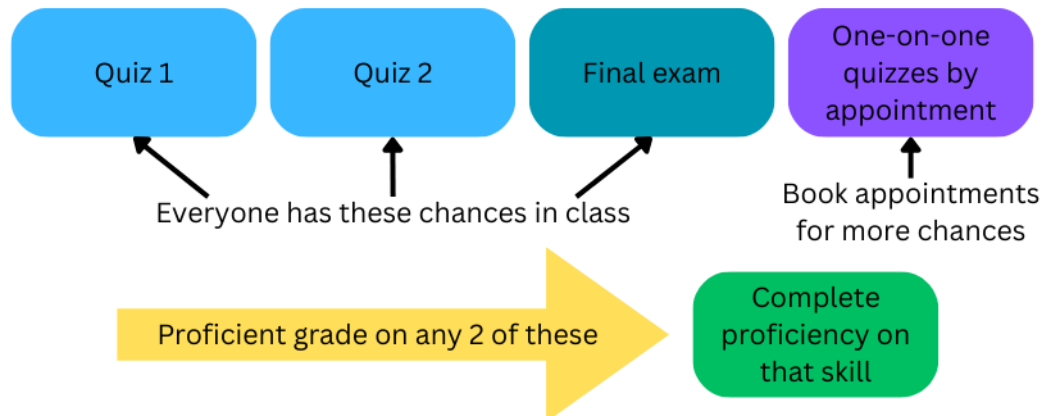
Homework: Online homework will help you practice skills and prepare for class. There will be around 36 total assignments, due at midnight on Tuesdays, Thursdays, and Sundays. Your grade is determined not by your average score, but the number of completed assignments. An assignment is complete if

- 70% of possible points are earned by the due date, or
- 90% of possible points are earned by one week later.

Assignments cannot be completed beyond a week after the due date.

Skill proficiencies: Course content is divided into 20 skills (see pages 4-5). To complete a skill, earn a “proficient” grade on that skill twice. For each skill, you have at least 3 chances: 2 quizzes and the final exam. For additional chances or make-ups, schedule office hour appointments.

Chances to demonstrate proficiency

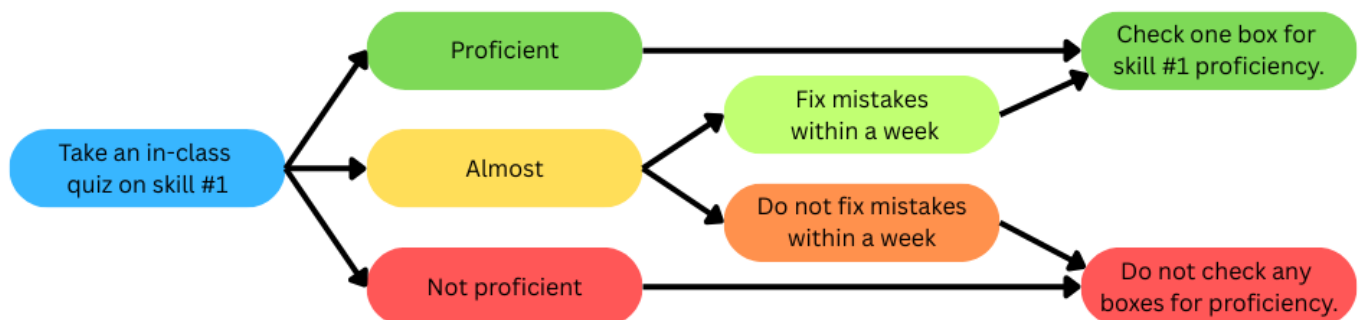


- *Quizzes* – Most class periods will end with a 15 minute quiz; the schedule shows which skill is covered on which day. Each skill gets 2 quizzes. Possible quiz grades are:

(P) Proficient, one partial proficiency in this skill.

(A) Almost proficient, small mistake. Submit a corrected version within a week to upgrade to P.

(N) Not proficient.



- *Final exam* – Each skill gets a separate page on the final exam. Each page is graded P/N, and a P grade completes one proficiency in that skill. The final exam is 8am December 9 for the 8:30am section, and 11:30am December 10 for the 11:30am section.
- *One-on-one assessments* – For make-ups or additional chances, make an office hour appointment through the Google calendar link on Blackboard for a one-on-one assessment of a skill (graded P/N). Maximum once per week per student.
- *In-class worksheets* – For every 3 completed and submitted in-class worksheets, I will add one proficiency to one skill, in a way that maximizes the benefit to your grade. Only worksheets completed during class will be credited. To be “complete,” a worksheet needs to exhibit effort on a majority of the problems, but it is not required that all questions be complete nor all answers be correct.

Disability accommodations: Talk to me if you have an accommodations letter so that we can discuss your specific needs. If you do not have an official letter, contact the Executive Director of Academic Support Services, Crit Muniz at (757) 233-8898 or in his office in Clark 204 or at disabilityservices@vwu.edu.

Attendance and alerts: Attendance is not part of the grade calculation, but I will take attendance and I will submit an academic alert any time any student misses two consecutive class days.

List of skills

Below are the 20 skills covered in this course. Check boxes are included as a way for you to track your progress – check off one box every time you receive a “Proficient” grade on that skill.

- ☐ ☐ **1 Tangent lines (part 1)** – From a graph, I can tell when a quantity is increasing, decreasing, concave up, and concave down. I can identify whether a line has positive, negative, or zero slope. I can draw secant and tangent lines, and I can calculate a slope of a secant line.
- ☐ ☐ **2 Limits and continuity** – I can compute limits from graphical data. I can identify removable, jump, and infinite discontinuities, and describe when a function is continuous in terms of limits.
- ☐ ☐ **3 Extreme values (part 1)** – I can identify extreme values and inflection points from graphical data. I can relate extreme values and inflection points to tangent lines. I can state the Extreme Value Theorem. I can identify when the Extreme Value Theorem does and does not apply.
- ☐ ☐ **4 Curve sketching (part 1)** – I can sketch curves from information about intercepts, increasing and decreasing intervals, concavity, local extrema, and inflection points.
- ☐ ☐ **5 Areas and definite integrals (part 1)** – I can use definite integral notation to describe areas under curves. I can evaluate a definite integral of a piecewise linear curve. I can use a Riemann sum to approximate a definite integral.
- ☐ ☐ **6 Rates of change** – I can calculate the average rate of change of a function from a graph or function formula. I can sketch a graph of the derivative function from a graph of the original function. I can relate average and instantaneous rates of change.
- ☐ ☐ **7 Limit definition of the derivative** – I can explain the purpose and meaning of every component of the limit formula for the derivative. I can use the limit definition of the derivative to calculate a derivative of a quadratic function. I can use notation such as $\frac{d}{dx}, \frac{dy}{dx}, \frac{df}{dx}$ for derivatives.
- ☐ ☐ **8 Derivative formulas (part 1)** – I know the derivatives of power, trigonometric, exponential, and logarithmic functions. I can read and use notation such as $\frac{d}{dx}, \frac{dy}{dx}, \frac{df}{dt}$ to describe derivatives.
- ☐ ☐ **9 Antiderivative formulas (part 1)** – I know the antiderivatives of power, trigonometric, and exponential functions. I can read and use $\frac{d}{dx}^{-1}$ notation and indefinite integral notation to describe antiderivatives.
- ☐ ☐ **10 Derivative formulas (part 2)** – I can use the constant multiple, sum, product, quotient, and chain rules to calculate derivatives.

- ☐ **11 Antiderivative formulas (part 2)** – I can use the constant multiple and sum rules to calculate antiderivatives. I can use u -substitution to calculate antiderivatives.
- ☐ **12 Tangent lines (part 2)** – I can use point-slope form to write an equation for a line, and I can find equations for tangent lines to curves (by calculating derivatives). I can determine if a function is increasing or decreasing, and concave up or down from a function formula.
- ☐ **13 Implicit differentiation** – I can compute $\frac{dy}{dx}$ for implicit curves using implicit differentiation, and I can use this to find equations of tangent lines to implicit curves.
- ☐ **14 Extreme values (part 2)** – From a function formula, I can locate and classify critical values as local maximum, local minimum, or neither using the first derivative test. I can find the absolute maximum and absolute minimum of a continuous function on a closed interval.
- ☐ **15 Curve sketching (part 2)** – From a function formula, I can sketch a curve using information I work out from the first and second derivatives.
- ☐ **16 Fundamental theorem** – I can use the Fundamental Theorem of Calculus to evaluate definite integrals of polynomials, fractional and negative powers, sine and cosine, and exponential functions.
- ☐ **17 Integrals via u -substitution** – I can evaluate definite integrals using u -substitution.
- ☐ **18 Areas and definite integrals (part 2)** – I can set up definite integrals for areas under curves, and use the Fundamental Theorem of Calculus to evaluate these integrals.
- ☐ **19 Separable differential equations** – I have completed the in-class group project on December 3 and December 5. In the project, I set up a mathematical model, solved a separable differential equation, and interpreted the solution in terms of the model.

Note: There are no quizzes on skill #19.

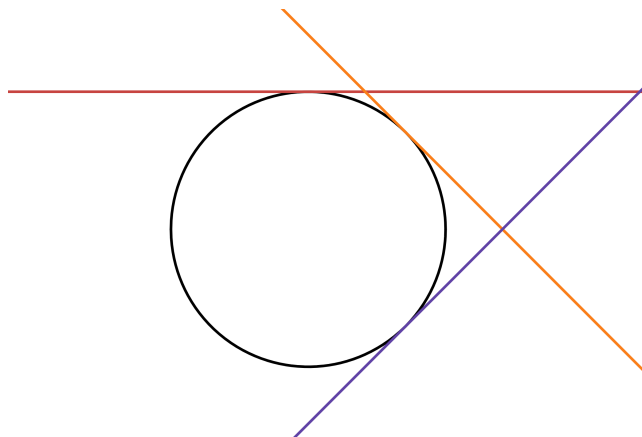
- ☐ **20 Sketching notebook** – I have completed the semester-long sketch notebook assignment, making one sketch per day of class.

Note: There are no quizzes on skill #20. Notebooks will be collected on November 24th.

Example sketch notebook entry

Date: Wednesday, August 27

Draw a circle, then draw three lines with different slopes that are all tangent to the circle



Schedule

Day	Skills covered	Quiz
Week 1		
August 25	1 Tangent lines (part 1)	
August 27	1 Tangent lines (part 1)	
August 29	2 Limits and continuity	1 Tangent lines (part 1)
Week 2		
September 1	<i>No class, Labor Day</i>	
September 3	2 Limits and continuity	
September 5	3 Extreme values (part 1)	2 Limits and continuity
Week 3		
September 8	3 Extreme values (part 1)	
September 10	4 Curve sketching (part 1)	3 Extreme values (part 1)
September 12	4 Curve sketching (part 1)	
Week 4		
September 15	5 Areas and definite integrals (part 1)	4 Curve sketching (part 1)
September 17	5 Areas and definite integrals (part 1)	1 Tangent lines (part 1)
September 19	6 Rates of change	5 Areas and definite integrals (part 1)
Week 5		
September 22	6 Rates of change	2 Limits and continuity
September 24	7 Limit definition of the derivative	6 Rates of change
September 26	7 Limit definition of the derivative	3 Extreme values (part 1)
Week 6		
September 29	8 Derivative formulas (part 1)	7 Limit definition of the derivative
October 1	8 Derivative formulas (part 1)	4 Curve sketching (part 1)
October 3	9 Antiderivative formulas (part 1)	8 Derivative formulas (part 1)
Week 7		
October 6	9 Antiderivative formulas (part 1)	5 Areas and definite integrals (part 1)
October 8	10 Derivative formulas (part 2)	9 Antiderivative formulas (part 1)
October 10	<i>No class, fall break</i>	

Day	Skills covered	Quiz
Week 8		
October 13	10 Derivative formulas (part 2)	6 Rates of change
October 15	11 Antiderivative formulas (part 2)	10 Derivative formulas (part 2)
October 17	11 Antiderivative formulas (part 2)	7 Limit definition of the derivative
Week 9		
October 20	12 Tangent lines (part 2)	11 Antiderivative formulas (part 2)
October 22	12 Tangent lines (part 2)	8 Derivative formulas (part 1)
October 24	13 Implicit differentiation	12 Tangent lines (part 2)
Week 10		
October 27	13 Implicit differentiation	9 Antiderivative formulas (part 1)
October 29	14 Extreme values (part 2)	13 Implicit differentiation
October 31	14 Extreme values (part 2)	10 Derivative formulas (part 2)
Week 11		
November 3	15 Curve sketching (part 2)	14 Extreme values (part 2)
November 5	15 Curve sketching (part 2)	11 Antiderivative formulas (part 2)
November 7	16 Fundamental theorem	15 Curve sketching (part 2)
Week 12		
November 10	16 Fundamental theorem	12 Tangent lines (part 2)
November 12	17 Integrals via u -substitution	16 Fundamental theorem
November 14	17 Integrals via u -substitution	13 Implicit differentiation
Week 13		
November 17	18 Areas and definite integrals (part 2)	17 Integrals via u -substitution
November 19	18 Areas and definite integrals (part 2)	14 Extreme values (part 2)
November 21	19 Separable differential equations	18 Areas and definite integrals (part 2)
Week 14		
November 24	19 Separable differential equations <i>Sketch notebooks due</i>	15 Curve sketching (part 2)
November 26	<i>No class, Thanksgiving break</i>	
November 28	<i>No class, Thanksgiving break</i>	
Week 15		
December 1	Skill checks by request	16, 17, 18
December 3	19 Separable differential equations	In class project
December 5	19 Separable differential equations <i>Last day of class</i>	In class project
Exam week		
December 9	8am Final exam for 8:30am section	
December 10	11:30am Final exam for 11:30am section	

Math 171 – Calculus 1 – Quick Reference

Table for final grades

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Track your progress

Homework: Check boxes for completed assignments.

August □□

September □□□□□□□□□□

October □□□□□□□□□□□□

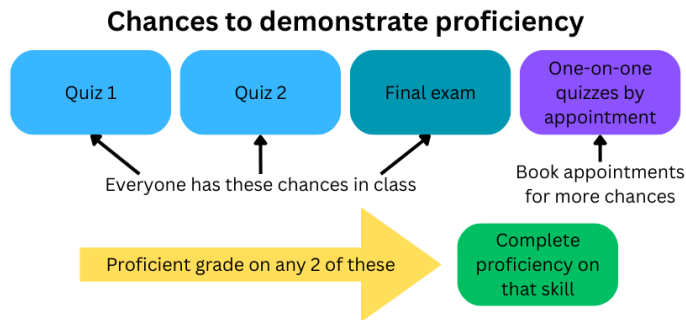
November □□□□□□□□

Skills: Check boxes for partial/full completion.

100

6 11 ☐ ☐16 ☐☐2 ☐☐7 12 ☐☐17 ☐☐3 8 13 ☐☐18 ☐☐4 9 14 ☐☐19 $\square$

5 □□

10 ☐☐15 ☐☐20 ☐

Example of how this works with skill 1:

August 25, 27 – Two classes on skill 1, working on example problems in class, homework includes more practice

August 29 – First quiz on skill 1

September 17 – Second quiz on skill 1

If both quizzes are P grades, skill 1 is done. If not, you can schedule office hour quizzes for more chances, and there is also another chance on the final exam.

Frequently asked questions:

1. *I missed class because of illness/sports/funeral/overslept, what do I do? Can I make up the quiz I missed?*

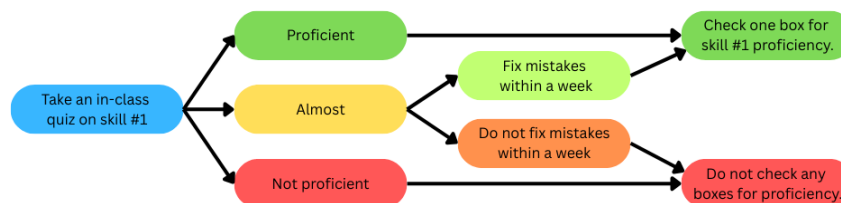
Consult Blackboard for the posted notes document, and ask a classmate to see their notes. To make up a quiz, book an office hour appointment with at least 24 hours notice.

2. *I didn't turn in my homework because of illness/sports/funeral/overslept/forgot, will you still accept it?*

Yes, assignments can be completed up to one week late, but need 90% of points to be complete.

3. *I got an “A” grade on a quiz, what do I do?*

You have one week to make corrections and re-submit. Using a different color of pen, correct all incorrect problems, including later questions that depended on earlier incorrect answers.



4. *I'm struggling, what can I do?*

Come chat with me. Book an office hour appointment and come prepared with questions about what is confusing you. Get in touch with the tutoring center.

5. *I did all the homework but am struggling with proficiencies, will my grade take this into account?*

No, that is not how grades are calculated in this class. You must complete at least 10 skills to pass the class.