The final exam is on 5/10 (Mon). In principle, it will cover all the topics we did in class. It will be helpful to read earlier exam papers and quizzes (the solutions for exams and quizzes were given out), the practice problem sets, the examples and problems from the textbook (like HW’s). For the final exam, you are allowed to bring one sheet of paper for your reference. Please bring also your calculator.

[General structure of the final exam]: There will be about five or so True/False questions (mostly conceptual, no long computations necessary) and twelve or so multiple-choice problems. For these, no work need to be shown (On the other hand, no partial credit will be given). In addition, there will be about six/seven problems where you will be asked to show all your work. Tentative scoring scheme will be:

\[ \text{T/F} (4 \times 5) + \text{MC} (6 \times 12) + \text{P} ((15 \text{ to } 20) \times 6) = 200, \]

but it could change (Considering the length, etc.).

[The topics]:

- (5.1)–(5.3): Definite integral as an area
- (5.4): Fundamental theorem of calculus, Finding derivative of an integral
- (5.5)–(5.7): Various techniques of integration (Substitution, Integration by parts, Partial fractions, . . .)
- (5.8): Using integral tables
- (5.9): Approximate integration (Riemann sum, Trapezoid rule, Simpson’s rule)
- (5.10): Improper integrals
- (6.1), (6.2): Area and Volume
- (6.3)–(6.5): Arc length, Average value, Work, Center of mass
- (6.7): Probability applications
- (8.1), (8.2): Sequence and Series, Geometric series
- (8.3), (8.4): Various convergence/divergence tests (nth term divergence test, Integral test and p-test, Comparison test and Limit-comparison test, Alternating series test, Ratio test, . . .)
- (8.5): Power series, finding Radius of convergence and Interval of convergence
- (8.6), (8.7): Representing functions as power series, Taylor series (in particular, power series for \( \frac{1}{1-x} \), \( e^x \), \( \sin x \), \( \cos x \), \( \tan^{-1} x \), and their variations)
- (8.9): Estimation problems using Taylor series (cases using Alternating series and using Taylor’s inequality)
- (7.1), (7.2): Differential equations, Direction field, Euler’s approximation method
- (7.3): Solving DEs (Separation of variables method)
- (7.3)–(7.5): Applications using DEs (Mixing problems, Population growth/Radioactive decay problems, Logistic equation, . . .)