The purpose of the Outcomes List is to give you a concrete summary of the material you should know, and the skills you should acquire, by the end of this course.

This outcomes list will be updated with specific review problems and topics for each exam of the quarter.

The following information is for reviewing the material for Exam 3:

**Exam 3 will cover Chapters 10.5, 10.6, and 10.7**

10.5 Know when and how to use the Comparison Test, Limit Comparison Test, Ratio Test, and Root Test to determine if a series with no negative terms converges.

In addition to the assigned problems from 10.5: pg. 664 Exercises 28, 32, 38

10.6 Determine if an alternating series converges using the Alternating Series Test. Analyze the absolute values of the terms of a series and determine if it converges. Know when and how to use various convergence tests (any test that we have talked about this term) to determine if a series with negative terms converges absolutely, converges conditionally, or diverges. Find a partial sum that approximates a convergent alternating series to some specified accuracy.

In addition to the assigned problems from 10.6: pg. 670 Example 4, pg. 673 Exercises 23, 29, 35

10.7 Be able to find the local linear and local quadratic approximations of a function \( f(x) \) at \( x = x_0 \). Determine the Maclaurin polynomials of various degrees for \( f(x) \), including writing the \( n^{th} \) Maclaurin polynomial with sigma notation. Determine the Taylor polynomials of various degrees for \( f(x) \) about \( x = x_0 \), including writing the \( n^{th} \) Taylor polynomial with sigma notation.

In addition to the assigned problems from 10.7: pg. 684 Exercises 11, 24, 36

The preceding information is for reviewing the material for Exam 3.
The following information is for reviewing the material for Exam 2:

Exam 2 will cover Chapters 10.1, 10.2, 10.3, and 10.4

10.1 Be able to: find the general term of a sequence; determine whether a sequence converges (and if so, what it converges to) by taking the limit of the general term; use techniques such as L’Hopital’s Rule and the Squeeze Theorem to help find the limit of a sequence.

In addition to the assigned problems from 10.1: pg. 630 Example 7, pg. 633 Exercises 10, 20

10.2 Know when and how to use one of the three tests for monotonicity to determine if a sequence is increasing, decreasing, eventually increasing, or eventually decreasing. Determine if a sequence that is defined recursively is eventually increasing and bounded from above or eventually decreasing and bounded from below, and if it is determine the limit of the sequence.

In addition to the assigned problems from 10.2: pg. 639 Examples 4, 5, pg. 642 Exercise 24

10.3 Be able to: determine if an infinite series converges by taking the limit of its sequence of partial sums; recognize a geometric series and write $a$ and $r$ for the series, determine if the geometric series converges, and if it does converge find what it converges to; write a repeating decimal as a rational number using a geometric series; recognize a telescoping series (using partial fractions if necessary) and determine what the series converges to.

In addition to the assigned problems from 10.3: pg. 650 Exercises 12, 28, 32

10.4 Be able to: use the Divergence Test to make a conclusion about the convergence of a series; use the Integral Test to make a conclusion about the convergence of a series; recognize a $p$-series and use the value of $p$ to make a conclusion about the convergence of a series; use algebraic properties of series.

In addition to the assigned problems from 10.4: pg. 658 Exercises 12, 22

The preceding information is for reviewing the material for Exam 2.
The following information is for reviewing the material for Exam 1:

Exam 1 will cover Chapters 9.1, 9.3, 9.4, and various integration techniques

Integration Techniques
It is assumed that in previous calculus courses you have learned various integration techniques, including substitution, integration by parts, and partial fractions (at least with distinct linear factors). Any exam this term might include problems that require these techniques, either as separate problems or within the context of other subjects, e.g. using integration by parts when solving an ODE.

9.1 Be able to: confirm that a given function is a solution to a differential equation; solve a first-order linear ODE by using integrating factors; solve a first-order separable ODE by using separation of variables; graph integral curves of an ODE; solve an initial-value problem (IVP); set up and solve a mixing problem.

In addition to the assigned problems from 9.1 look at: pg. 593 Exercises 14, 31, 44

9.3 Be able to set up and solve an IVP given a description of a model. Know the exponential growth and decay models, i.e. you should know the IVP and solution equations for these two models and be able to answer questions involving exponential growth and decay. Be able to answer questions about other models (e.g. Logistic Model, Newton’s Law of Cooling) given their IVP’s and solution equations.

In addition to the assigned problems from 9.3 look at: pg. 608 Exercises 4, 13, 40(a-d)

9.4 Be able to: solve a second-order linear homogeneous ODE with constant coefficients by finding an auxiliary equation whose solutions are either (1) real and distinct, (2) real and repeated, or (3) complex; solve IVP’s involving these types of ODE’s; prove that two functions are linearly independent.

In addition to the assigned problems from 9.4 look at: pg. 619 Exercises 10, 12, 22

The preceding information is for reviewing the material for Exam 1.