MATH 2644, Review for the Final Exam

- If you need copies of blank exams or solutions, come by my office to pick them up.
- The exam will be on Sections 6.1–6.3, 6.5, 7.1–7.4, 7.8, 8.1, 8.2, 10.1–10.4, 11.1–11.8, 11.10.

1. **Area between two curves.** Exam 1 #3

2. **Volume of a solid of revolution rotated about $y$-axis by your choice of “slice” method or “cylindrical shells” method.** Exam 1 #4, #5.
   The methods (the cross-section method or cylindrical shell method) to use were specified in the hour exam. In the final exam, you can choose the method you prefer.

3. **The average value of a function over the interval $[a, b]$.** Exam 1 #6

4. All the integration techniques that we learned **Integration by parts** in §7.1, **Trig integrals** in §7.2, **Trig substitution** in §7.3, **Integration of rational functions by partial fractions** in §7.4, and **Improper integrals** in §7.8. Exam 2 #1–#8
   - You may want to look through, again, the exercise problems assigned as review problems from §7.5 and §7.8; The list and the solution set are still available on our course webpage.

5. **Arc length, Arc length function, and Surface area of a revolution with $y = f(x)$.** Exam 3 #5, #6

6. **Graphing, Derivatives, Tangent lines, Areas between curves, Arc lengths, Surface Areas of revolutions with parametric equations $x = x(t), y = y(t)$.** Exam 3 #3

7. The followings regarding **polar curves** $r = r(\theta)$ will be be on the final exam:
   - **Points in the 2-dim plane in Cartesian coordinates and Polar coordinates.** Exam 3 #1
   - “Simple” graphing of a polar equation (on the $xy$-coordinates) such as circles or straight lines Quiz 5 #2
   - **Converting Polar equations to Cartesian equations, and then identifying the graph.** Exam 3 #2

8. The followings regarding polar curves $r = r(\theta)$ will NOT be on the final exam; they correspond to Exam 3 #4
   - Derivatives, Tangent lines of polar curves
   - “Complicated” graphing of a polar equation (on the $xy$-coordinates)
   - Arc length of a polar curve $r = r(\theta)$
   - Area between polar curves.

9. **Sequence and Series in Sections 11.1–11.7.** Exam 4 #1, #3, #4.
   But there is NO question on Monotone Bounded Sequence Theorem like #2 (though you need to know (a) showing decreasing/increasing).
10. **For a given Power series**, use Geometric series, Ratio test, or Root test to find the **Interval of Convergence and the Radius of Convergence.** Exam 4 #5

11. For a given function, finding a power series expansion as in **MacLaurin series and Taylor series.** Be sure to practice the examples in the handout on §11.10.

12. No question like #6 of Exam 4 that is also finding a power series of a given function using known series techniques such as Geometric series, Ratio test, or Root test.