Placement Diagnostic Supplement (From Brian Conrad)

The links below provide targeted guidance for self-instruction on some important topics in applications of integration (for the AB-level AP exam) and infinite series (for the BC-level AP exam) that were omitted from the AP Calculus syllabus this year. These are taught in our respective courses Math 1a and 1b; they arise on the placement diagnostic.

Note that some of parts of these topics are used in Math 21a and they are used ubiquitously in quantitative fields outside of mathematics. If your placement recommendation is beyond the Math 1a or Math 1b level and you are not familiar with this material, then we urge you to spend some time this summer self-studying to catch up with it.

Our recommended linked resources as given below consist of three types: specific Khan Academy videos, specific portions of some MIT OpenCourseWare videos, and specific exercises in the free OpenStax calculus e-book. The Khan Academy video series also include practice exercises for which the answer is checked for correctness. Some of the recommended OpenStax exercises have an underlined (or hyperlinked) exercise number, in which case clicking on that number will take you to the answer. Either of these two collections of suggested exercises provide sufficient practice.

Finding the Area Between Curves Expressed as Functions of x:
- Khan Academy videos
- MIT Open Course video (clip 28:30 — 44:30)
- OpenStax Exercises #1-6

Volume with Disc Method: Revolving Around the x- or y-Axis:
- Khan Academy videos,
- MIT Open Course video (clip 0:00 — 17:00)
- OpenStax Exercises #67, 69, 71, 73.

Volume with Washer Method: Revolving Around the x- or y-Axis:
- Khan Academy videos

The nth Term Test for Divergence:
- Khan Academy videos
- OpenStax Exercises #138 - 144.

Integral Test for Convergence:
- Khan Academy videos
- MIT Open Course video (clip 29:00 — 45:00)
- OpenStax Exercises #158 — 163.

Comparison Tests for Convergence:
- Khan Academy videos
- OpenStax Exercises #195 —199 and #207 — 215.

Radius and interval of Convergence of Power Series:
- Khan Academy videos
- OpenStax Exercises #7, 9, and #11 — 15.