Math 2E – Suggested Homework 2

Peyam Tabrizian

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Reading: Sections 15.6, 15.7, and 15.8. 15.7 and 15.8 are all about generalizations of polar coordinates in 3 dimensions. Strictly speaking, section 15.7 is unnecessary because you can always evaluate your integrals using regular polar coordinates; ignore Example 3. Section 15.8 is extremely difficult, but also **extremely** important. Remember Formula 3, but ignore the derivation, we'll find a much neater way to do this in section 15.9. There will be more 15.8 problems on the next assignment.

- **Section 15.6:** 17, 21, 22, 53, 54, AP
- **Section 15.7:** 1, 5, 6, 17, 18, 19, 21, 22, 23, 24
- **Section 15.8:** 1, 5, 12

Additional Problem[1] Find the volume of E, where E is the solid enclosed by the two cylinders $x^2 + y^2 = 1$ and $x^2 + z^2 = 1$.

Note: For some of the problems, the following identities might come in handy:

$$\sin(\theta)\cos(\theta) = \frac{1}{2}\sin(2\theta), \quad \cos^2(\theta) = \frac{1+\cos(2\theta)}{2}, \quad \sin^2(\theta) = \frac{1-\cos(2\theta)}{2}$$

Important: I will be out of town from Wednesday 01/15 to Friday 01/17. Here is the schedule of lectures for this week and next week:

[1] For solutions, see the last problem in Lecture 3, which has been updated as of 1/13 at 8 pm

- Tuesday 01/14: **Make-up lecture during discussion**. You'll have the opportunity to attend the following make-up lectures: 1-2 pm in 1200 DBH, 2-3 pm in 100M HICF, 4-5 pm in 118 MSTB. (The 8 am discussion in 128 SH is cancelled)
- Wednesday 01/15: **Discussion during lecture**, no office hours/virtual office hours that day
- Thursday 01/16: Usual discussion + Quiz
- Friday 01/17: **Lecture is cancelled**
- Monday 01/20: No lecture (MLK day)
- Tuesday 01/21: **Make-up lecture during discussion**: 1-2 pm in 1200 DBH, 2-3 pm in 100M HICF, or 4-5 pm in 118 MSTB.