Multivariable Calculus

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Welcome to Math 213, Spring 2019!

- Bookmark the course web page
  http://www.math.uky.edu/~perry/213-s19
- Bookmark the instructor webpage
  http://www.math.uky.edu/~njst237/213-s19
- Familiarize yourself with the Canvas Page for this course
- Print out a copy of the Course Calendar and keep in your notebook

Tests

- Tests are from 5-7 pm on Wednesday 2/6, 3/6, and 4/10.
- The final exam is from 6-8 pm on Wednesday 5/1.
- Each test is worth 20% of your grade and the final is also worth 20% of your grade.
- For testing accommodations I need to see a letter from the DRC.
- If you have a conflict with one of these times and need an alternate exam, fill out of the form on the syllabus webpage as soon as possible.

Homework

Prepare for recitation tomorrow:

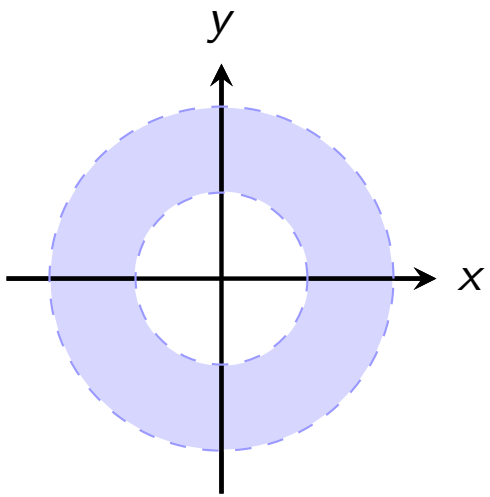
- Section 4: 11 AM in CB 341. Section 5: 8 AM in CB 337. Section 6: 9 AM in CB 337.
- Study section 12.1, pp. 792–796
- Begin problems 3, 5, 7, 15-23 (odd), 33, 35, 37, 41, 45, 47 in section 12.1, pp. 796–797
- Create your Webwork account by *logging in through Canvas and going to Modules*
- Begin Webwork Assignment A1 – Remember to access WebWork *only through Canvas!*

For Friday, read and study section 12.2, pp. 798–804.

Unit I: Geometry and Motion in Space

Lecture 1	Three-Dimensional Space
Lecture 2	Vectors: Moving Around in Space
Lecture 3	The Dot Product, Distances, and Angles
Lecture 4	The Cross Product, Areas, and Volumes
Lecture 5	Equations of Lines and Planes, Part I
Lecture 6	Equations of Lines and Planes, Part II
Lecture 7	Cylinders and Quadric Surfaces
Lecture 8	Vector Functions and Space Curves
Lecture 9	Derivatives and integrals of Vector Functions
Lecture 10	Motion in Space: Velocity and Acceleration
Lecture 11	Functions of Several Variables
Lecture 12	Exam 1 Review

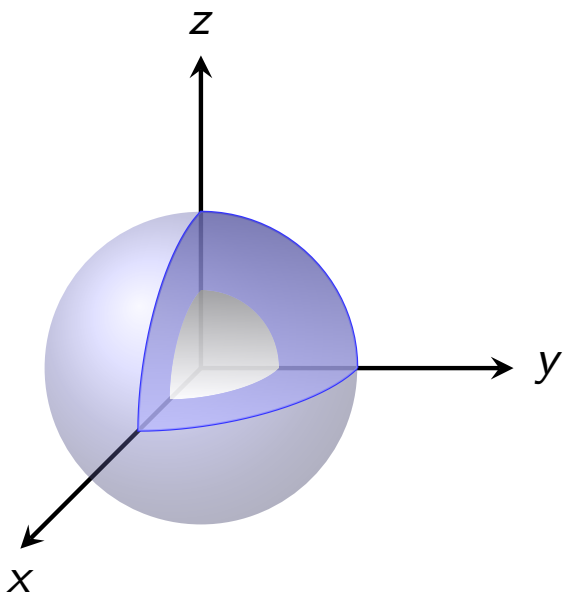
Two and Three Dimensions



Find the set of points (x, y) that satisfy the *inequality*

$$1 < x^2 + y^2 < 2$$

Answer: The annulus centered at $(0, 0)$ and bounded by circles of radii 1 and 2



Find the set of all points (x, y, z) that satisfy the *inequality*

$$1 < x^2 + y^2 + z^2 < 4$$

Answer: The spherical shell centered at $(0, 0)$ with inner radius 1 and outer radius 2

The Two Most Important Formulas in this Lecture

Distance Formula in Three Dimensions The distance $|P_1P_2|$ between $P_1(x_1, y_1, z_1)$ and $P_2(x_2, y_2, z_2)$ is

$$|P_1P_2| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

Equation of a Sphere The equation of a sphere with center (h, k, ℓ) and radius r is

$$(x - h)^2 + (y - k)^2 + (z - \ell)^2 = r^2$$