Math 10C First Midterm Exam Review Outline
Math 10C, Spring 2018

The first midterm exam covers the topics discussed in lecture during Weeks 1, 2, and 3. In particular, the exam will test your mastery of the material in Sections 9.1, 9.2, 9.3, 9.4, and 9.5. As a rule of thumb, the exam will cover concepts, skills, and materials that appeared in the homework and the lecture. If something from the textbook has not been part of the homework or the lecture, then you will not need it specifically. Below is a summary of the topics/skills you need to master from each section.

- **Section 9.1:** Know how to describe simple geometric shapes by equations, and vice versa know how to identify shapes from given equations. Textbook examples 1-7 and lecture examples.

- **Section 9.2:** Know the basic definitions of vector arithmetics (scaling, addition, subtraction, length, direction, parallelity) and how these interplay with each other. Laws of vector arithmetics. Standard basis vectors. Unit vectors.

- **Section 9.3:** Know the dot product and its various geometric interpretations, such as when computing the angle between vectors or the projection onto a line. Know how it relates to parallelity and perpendicularity. Arithmetic properties of the dot product.

- **Section 9.4:** Know the cross product and its various geometric interpretations, such as when computing the area of a parallelogram, the area of a triangle, or the volume of parallelepiped. Orthogonality relations. Cross product of standard basis vectors. Arithmetic Properties of the cross product. Checking whether three vectors form a right-hand system.

- **Section 9.5:** Understand the different ways of representing lines and planes. Vector equations and parametric equations for lines. Know how to determine whether lines are parallel, skew, coincide, or intersect at one point. Find the intersection of lines and check whether points lie on line. Construct lines when specific geometric information are given. Vector equation, scalar equation, and linear equation for a plane. Find a plane given certain geometric data. How to check whether two planes are parallel, or whether vectors are parallel or orthogonal to a specific plane.