§12.1-12.4

§12.1

- Functions of two variables: plugging in numbers into a function and reading a table of values for a function.
- Plotting points in 3 space.
- The distance formula.

§12.2-12.3

- The graph of a function f. I.e. the set of points in three space of the form $(a, b, f(a, b))$.
- Cross sections and level curves of a function. Know how to use these to help grah a function of two variables.
- Contour maps (also called contour diagrams).

§12.4

- Linear functions.
- Graphs of linear functions are planes.

§13.1-13.4:

§13.1:

- Vectors in 2 and 3 dimensions. Displacement vectors between two points.
- Magnitude (length) of vectors.
- The component vectors $\vec{\mathbf{i}}$, $\vec{\mathbf{j}}\vec{\mathbf{k}}$.
- Addition, scalar multiplication, subtraction. Understand how do these operations using components, and what they mean geometrically.

- What does it mean for vectors to be parallel? Perpendicular?
- Unit vectors.

§13.2

- Word problems.
- Writing vectors in two dimensions in "polar form". I.e. $\overrightarrow{\mathbf{v}} = \langle r\cos\theta, r\sin\theta\rangle$ where $r = \|\overrightarrow{\mathbf{v}}\|$ and θ is the angle $\overrightarrow{\mathbf{v}}$ makes with the positive x-axis.

§13.3

- The dot product. In particular, the "algebraic definition" and the "geometric definition".
- Using the dot product to find the angle between two vectors. In particular, two vectors are perpendicular if and only if their dot product is zero.
- Finding the equation of a plane if you know a point on the plane and a vector orthogonal to the plane.
- Projections. I.e. given two vectors $\overrightarrow{\mathbf{v}}$ and $\overrightarrow{\mathbf{w}}$, write $\overrightarrow{\mathbf{v}} = proj_{\overrightarrow{\mathbf{w}}}(\overrightarrow{\mathbf{v}}) + \overrightarrow{\mathbf{v}}_\perp$ where $\overrightarrow{\mathbf{v}}_\perp$ is perpendicular to $\overrightarrow{\mathbf{w}}$ and $proj_{\overrightarrow{\mathbf{w}}}(\overrightarrow{\mathbf{v}})$ is parallel to $proj_{\overrightarrow{\mathbf{w}}}(\overrightarrow{\mathbf{w}})$.

§13.4

- The cross product. In particular, the "algebraic definition" and the "geometric definition".
- Properties of the cross product.
- Using the cross product to find a normal vector to a plane.
- Using the cross product to compute the area of the parallelogram spanned by two vectors.