Today we discuss

1. the topics covered in MA 242 in general terms and
2. how this course will operate.

Rough Outline of MA 242

1. Linear Equations and Transformations
   (a) row reduction
   (b) solution sets of linear equations
   (c) linear transformations

2. Matrix Algebra
   (a) matrix operations
   (b) invertible matrices
   (c) computer graphics

3. Determinants
   (a) definition and properties
   (b) geometric interpretation

4. Abstract vector spaces
   (a) vector spaces and subspaces
   (b) bases and dimension

5. Eigenvalues and eigenvectors
   (a) eigenspaces
   (b) diagonalization

6. Orthogonal sets and matrices
Linear programming example:

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Food 1</th>
<th>Food 2</th>
<th>Required Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30 units/ounce</td>
<td>20 units/ounce</td>
<td>120 units</td>
</tr>
<tr>
<td>B</td>
<td>40 units/ounce</td>
<td>10 units/ounce</td>
<td>80 units</td>
</tr>
<tr>
<td>C</td>
<td>20 units/ounce</td>
<td>40 units/ounce</td>
<td>100 units</td>
</tr>
<tr>
<td>Cost</td>
<td>10 cents/ounce</td>
<td>15 cents/ounce</td>
<td></td>
</tr>
</tbody>
</table>
Fractal examples: Consider the square

\[ S = \{(x, y) \mid 0 \leq x \leq 1, \ 0 \leq y \leq 1\} \]

and three different ways to “map” \( S \) inside of itself.