Transition to Advanced Mathematics: assignments 9

1) In this problem we shall construct $\mathbb{Z}/11\mathbb{Z}$.

   a) Let $\mathbb{Z}$ be the set of all integers.

   b) Give 5 examples of elements of $\mathbb{Z}$.

   c) Let $11\mathbb{Z}$ be the set of all integer multiples of 11.

   d) Give 5 examples of elements of $11\mathbb{Z}$.

   e) Define a relation on $\mathbb{Z}$ via $x{\sim}y$ iff $x - y \in 11\mathbb{Z}$.

   f) Show that $\sim$ is an equivalence relation.

2) In this problem we shall construct $L([0,1])$ish

   a) S be the set of all continuous functions on $[0,1]$.

   b) Give 5 examples of elements of S.

   c) Define a relation on S via $f{\sim}g$ iff

$$\int_0^1 (f(x) - g(x))dx = 0$$

   d) Show that $\sim$ is an equivalence relation.

These problems are due on April 3rd