3.1 List all the possible generators of the cyclic group Z_6.

$1(1^0 = 1, 1^1 = 1, 1^2 = 2, 1^3 = 3, 1^4 = 4, 1^5 = 5, 1^6 = 0)$

$5(5^0 = 1, 5^1 = 5, 5^2 = 4, 5^3 = 3, 5^4 = 2, 5^5 = 1, 5^6 = 0)$

3.2 Show that group $Z_n$has exactly n endomorphisms.

To put this more clearly, we must show that $Z_n$has exactly n functions f:$Z_n \rightarrow Z_n$such that f(x+y) = f(x)+f(y), assuming $Z_n$is an additive group.

How many functions are distributive over addition in Z_n? Just multiplcation, which is a binary operator.

So the number of functions f(n) which multiply a number n by a fixed amount constitue the number of endomoprhisms in Z_n. But there can only be n such functions.

3.3 Show that Z_5us generated by any element not the identity.

In general $Z_n$can be generated by any element $x \in Z_n$such that it's not the case that $x \equiv n(modn)$.

Thus, 2,3 4 can all be used to generate Z_5.

3.4 Show that the cyclic group Z_{14}can be generated by anyone of six generators.

1,3,4,5,6,8–why won't 9,10,11,12,13 also generate it?

13(0,13,12,11,10,9,8,7,6,5,4,3,2,1)