Day 12 (July 18, 2012)

A *group* is a set of things and an operation (*) on those things that has these four properties.

1. The * operation is *closed*: If a and b are in the set, then $a*b$ must also be in the set.
2. The * operation is *associative*. (but it's not required to be commutative)

$$a*(b*c) = (a*b)*c$$

3. The set has contains something that acts like the *identity*. $\longrightarrow a * 1 = 1 * a = a$

   Ex: For the symmetries of the triangle under "then", there is a do nothing transformation. (1 2 3) then () = (1 2 3)

4. Every item in the set has an *inverse*.

   Ex: In $(U_9, \times)$ $U_9=\{1, 2, 4, 5, 7, 8\}$

   $1\times1=1$ $2\times5=1$ $4\times7=1$ $8\times8=1$