Discrete Mathematics

Functions

Number of One-One functions - Part 2

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So given let's say A, B, C and 1, 2, 3, how many possible one-one functions can you think of? Let me enumerate this properly. How will I do this? I will simply write A, B, C and below A, B, C I will write the mapping A goes to 1, B goes to 2, C goes to 3. 1, 2, 3. Another way is A, B, C go into let's A got to 2, B goes to 1 and C goes to 3.

Now I again write this as 2, 1, 3. If you know what I mean. Correct. I simply write A goes to 2, I write 2 below A. Now do you observe something? You must be smart enough to observe that all I am doing here is writing all possible permutations of 1, 2, 3. 123, 213, 312, 321 so on. How many are there? Let's enumerate all of them. 123, 132, 213, 231, 321, 312. You have precisely six of them. A better way to say it. A smarter way to say it is there are three factorial of them. So total possible one-one function from ABC to 123 this question boils down to asking this question of in how many ways can you arrange 123. All possible permutations happens to be 6. As I told you three factorial. And now that's the answer. Perfect.

Total possible one-one functions

from $\{a, b, c\}$ to $\{1, 2, 3\}$?

In how many ways can you

arrange $\{1, 2, 3\}$?

$= \boxed{6}$

So now let's go ahead and ask a slightly more complicated question than this.