Math3C: Quiz1

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Note that these answers are not reviewed by Dr. Weisbert and/or may include some errors (as we figured out first week). If you find one or more, let me know and I'll edit the document. My email is wesleytk@ucla.edu.

C Level Problem. Four friends go to get piercings. Each friend will get exactly one piercing and the friends will simultaneously receive their piercings. Three types of piercings are available: a nose, tongue, and belly piercing. How many different ways can the group of four friends get their piercings?

The four friends are distinguishable, so that means that we care about 'order.' Each friend has 3 choices, so we have 3^4.

B Level Problem. You have six rings: a red, orange, yellow, green, blue, and violet ring. You will put all six rings onto the five fingers of your right hand. You will put two rings on one finger and one ring on each of the four remaining fingers. You then take a photo of your hand (your hand is in the same position and orientation in any photo you take). How many different photos can you take?

Let's choose the finger that has two rings on it first, which we have 5 possibilities for it. For the rest of the fingers, we can reorder them to create new sequences, resulting in 4! different sequences.

So now how many different possibilities do we have for that doubled up finger? We can tell the difference between which ring we put on first and second, so order matters. If we choose the doubled up finger first, we have 6 choices for the first ring on that finger, and 5 choices for the second ring on that finger.

Now we just use the rule of multiplication to combine them all: $5 \cdot 4! \cdot 6 \cdot 5$.

A Level Problem. Four friends go to get piercings. Each friend will get exactly one piercing and the friends simultaneously receive their piercings. Three types of piercings are available: a nose piercing, tongue piercing and belly button piercing. How many different piercings can the group of four friends get if one of the friends, Alice, decides that if Bob gets a nose piercing, she will get her belly button pierced?

Case: Bob gets a nose piercing. Then Bob has 1 option, Alice has 1 option, and the other 2 friends each have 3 options, giving 3^2.

Case: Bob doesn't. Then Bob has 2 options, Alice has 3 options, as do the other 2 friends, giving $2 \cdot 3^3$.

Adding the cases gets: $3^2 + 2 \cdot 3^3$.