

6. (10 points) Suppose that there are 4 Martians, 4 Venutians, 3 Jovians, and 4 Terans that need to get in line to purchase their ticket to the Outer Rings. Martians and Jovians do not get along and neither do Venutians and Terans. So, no Martian can stand next to a Jovian and no Venutians can stand next to a Teran. How many different ways can these interplanetary travelers stand in line? Be sure to show your work and, to maximize partial credit, discuss your work.

$$4 + 4 + 3 + 4 = 15$$

both Terans



$$s_1 \quad s_2 \quad s_1 \quad s_2 \quad s_1 \quad s_2 \quad s_1 \quad s_2 \quad s_1 \quad s_2 \quad s_1 \quad s_2 \quad s_1 \quad s_2 \quad s_1$$

$$s_1 = 4! = 24$$

$$s_2 = 4! = 24$$

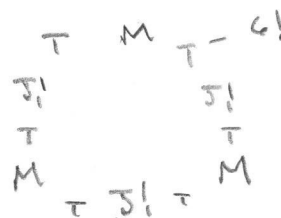
$$5040 \cdot 40320 = 203212800$$

7. (10 points) Some of the Terans meet some old friends at the Outer Rings and giddy from their vacation festivities, 3 Martians and 3 Jovians decide to go to dinner with 7 Terans. Since Martians and Jovians do not get along, they can't sit next to each other around the round dinner table. How many different ways can our interplanetary travelers sit around the round dinner table? Be sure to show your work and, to maximize partial credit, discuss your work.

Martians can be placed 1 way = 1

$$\text{Jovians} = 3! = 6$$

$$\text{Terans} = 7 \cdot 6!$$



Extra Teran can be placed anywhere = 12 places

$$1 \cdot 6 \cdot 7 \cdot 720 \cdot 12 = 362880$$