

Additional Review Questions for Math 21, Fall 2009

Nikos Apostolakis

For the next three questions recall that while on Earth, having ten fingers, we use a base 10 system the inhabitants on planet Firfe, having only one hand, use a base 5 system and on planet Triton, where they have only one hand with three fingers, they use a base 3 system.

- Complete the following table that translates numbers written in one of the three systems to the other two.

Earth	Firfe	Triton
459		221
1001	443	
	43321	10000
9995		221001
		1010102

- If possible find a winning first move for each of the following Nim games:

- Out of 40 people, 20 wear blue pants, 25 wear green shirts and 15 wear red shoes. Of these people 10 wear blue pants and green shirt, 9 wear green shirts and red shoes and 5 wear blue pants and red shoes. If 3 people wear blue pants, green shirt and red shoes, how many people do not wear any of blue pants, green shirt or red shoes?
- Out of 60 people, some like tomatoes, 31 like broccoli, and 34 like string beans. Of these people 16 like tomatoes and broccoli, 17 like broccoli and string beans, and 15 like broccoli and tomatoes. If 10 people like tomatoes, broccoli, and string beans and 8 don't like either of the three, how many people like tomatoes?
- In how many ways can we choose a committee of 5 people out of 10 people?
- In how many different ways can 4 people sit in 9 numbered seats?
- In how many different ways can we get a "two of a kind" hand¹ in poker?

¹In a "two of a kind" hand, exactly two of the five hands are the same kind.