Analysis H – Deggeller / Hahn Don't flip out – It's just a quiz (Ohhhhhhhh SNAP): Hannah Kim

GAtM Quiz 1 2017 (21 points) 17/21 Per: B

1. a) What are the 4 characteristics of a mathematical group? [4 pts]

1) Commutative
2) associativity
3) identity
4) invertibility

b) Would the set of numbers {0, 1, -1} be a group under addition? If not, why not? [2]

yes. all possible combos are w/in group (-2)

1 + 0 = 1 1 + -1 = 0 0 + -1 = -1

2. How many elements are there in the 5-post snap group? [2]

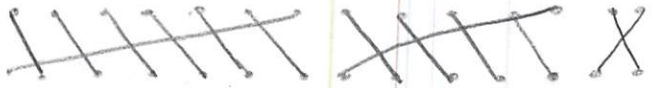
5! = 120

3. Below are some of the elements of the 8-post snap group. Below each element, write down its period. [1 each]

a) X|X|X b) XX|||| c) XXX d) XXX X|

2 4 6 10

4. What is the **maximum** period of an element in the 14-post snap group? Draw the element. (don't worry, you'll get partial credit if you draw an element and correctly identify its period, even if it's not the maximum) [3]



7 5 2

period = 70 (-1)

5. The 4-post snap group is NOT isomorphic to the flip-rotation group of a square. Give **one** reason (but be specific) to support the validity of this statement. [2]

4 post snap group = 4! elements = 24 elements

fr of a □ = f, fr, fr², fr³, r, r², r³, I = 8 elements

isomorphic groups must be the same size in order to have corresponding elements. The 4p group & fr□ are not the same size and so aren't isomorphic

6. Given the following two operations, which are generators of group G.

r = rotation of 20 degrees (18) f = flip over the x-axis

a) What is the order of group G (how many elements are in group G)? [2] 36

b) Name a geometric group that is isomorphic to group G. Be specific. [2]

shape with 18 sides, all evenly spaced apart (160° vertices) (-1)