Prof. C. von Renesse

Honors Math Explorations 110

December 10, 2013

Final Salsa Dancing Proof

N: The number of pairs of dancers participating in the salsa dancing.

K: The number of dames performed by the dancers.

QUESTIONS: 1. Will we always get back home regardless of how many dames we do?

2. Why does a common factor between the number or pairs (N) and the number of dames (K)

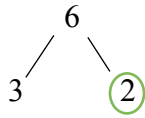effect whether or not you will dance with every person?

After messing with the idea of the greatest common factor and least common multiple, I

have come to the conclusion that we WILL always come back to our starting places regardless of

the number of dames. I have also decided that if N and K have a common factor they WILL

NOT dance with every dancer, but if N and K do not have a common factor than they WILL

dance with everyone individual in the group.

We can prove that a dancer will come back home because any two numbers can be

multiplied to create a common multiple. This way every time the dancers travel around the circle

and a common multiple of N and K is hit, the dancer will then return back to their starting
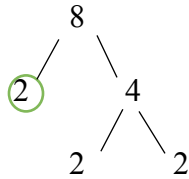
position in that moment.

The common factors of N and K link with whether or not the dancers dance with

everyone in the group. With a common factor between N and K, the number of dancers can then

be reduced so that they will not dance with everyone in the group. Without a common factor, or a

common factor greater than one to be more specific, N and K cannot possible be reduced;

leaving the dancers with no choice but to dance with everyone. This can be displayed by the factor trees and diagrams below.
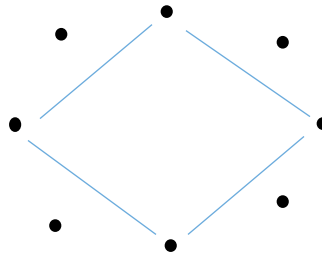
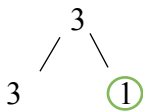**Number of dames (K):**   **Number of pairs (N):**

6   8 $6 / 2 = 3$

3   (2)   (2)   4 $8 / 2 = 4$

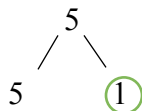2   2   *Both numbers are evenly reduced by a common

factor, so they WILL NOT dance with everyone

Number of dames (K):   **Number of pairs (N):**

3   5 $3 / 1 = 3$

3   (1)   5   (1) $5 / 1 = 5$

*Neither can be reduced because they do not have a

common factor greater than 1 and therefore WILL

dance with everyone