Nagle Community College Maths Circle: Week 2

November 20th, 2011

Plan

1. Matchstick Problems
2. The Nim Game
3. Problem Solving

1. Matchstick problems

Divide into groups of four and work together to solve the matchstick problems.

**Turning the Donkey**

Move 1 matchstick to turn the donkey.

2 squares to 3

Move 4 matches to make 3 squares -
Swimming Fish

Turn the fish around by moving only 3 matches, no overlapping.

Then try and turn the fish by moving only 2 matches, no overlapping

3 triangles to 4

Move 3 matches to make 4 equilateral triangles, no overlapping
**3 squares to 5**

Move 6 matches so that 5 squares are formed

**Make 3 squares**

Move 3 matches to get 3 perfect squares
Remove a square(twice)

Move 2 matches to new positions to get only 4 squares, no overlapping or loose ends

Move 3 matches to new positions to get only 4 squares, no overlapping or loose ends
2. Nim:

A game for two players — the other person watches. There are 32 matches in a pile on the table. Players alternate turns. A turn consists of removing 1, 2 or 3 matches from the pile. The person who picks up the last matches from the table wins. Play the following. Players 1, 2 and 3. Match up 1 vs 2, 1 vs 3, 3 vs 2, 2 vs 1, 3 vs 1 and 2 vs 3. Is there a strategy that guarantees you win every time.

3. Problem Solving.

You can add up all the numbers from 1 to 100 on a calculator. Is there a quicker way to do this by hand?
Add up the numbers 1 to 5.
Add up the numbers 1 to 10 etc..
Can you see a pattern?

Summary

Eight students, all boys, attended this week. There was no teacher in the classroom with us this week. Although twice as many came the first week, I think they enjoyed it much more this week and that more will come next week. We stuck to hands on games and made everything competitive as this seems to be the best way to keep this group’s attention and to get them to push themselves.

The matchstick problems went well and were the perfect level of difficulty. We used lolly pop sticks instead of match sticks because they are bigger. Half the students were able to figure them out after some time, while the other half got them after a few hints. They enjoyed it, although if a teacher was present in the room with us, it might have prevented them from throwing the sticks at eachother.

The nim game also went well. The students paired off into twos and every group was able to figure out the strategy after a series of games. They enjoyed competing with eachother.

The problem of figuring out the formula for summing all the numbers from 1 to 100 was a bit too difficult. No student got it, though one came close. However when the solution was explained to them, they all seemed to understand.
We promised we would bring mastermind next week for them to play. They seemed very enthusiastic about this.