**Mondays Handshake puzzle:**

**Answer: 6**

Displaying this puzzle in a square format allows for a visual solution and also an introduction to graph theory. This is the study of graphs where a graph is used to demonstrate relations between objects. In this case we are demonstrating the relations between four people.



We can see that Amy (in the red jumper) will have a total of **3** handshakes: one with Liam, one with Samira and one with Luke.

Liam has already shaken hands with Amy so he will have **two** more handshakes: one with Samira and one with Luke.

Samira will have already shaken hands with Amy and Liam so she will only have **one** more handshake with Luke.

Luke, at this stage, will have shaken hands with everyone in the group.

There will be a total of **six** handshakes for four people.

**Tuesdays Siblings puzzle:**

**Answer: 4 children altogether**

Mary has 2 brothers and one sister, while John has 2 sisters and 1 brother.

This sort of puzzle can be solved using a technique called simultaneous equations. This is a technique that is covered in Junior Certificate mathematics and is very powerful in finding unknown quantities in a system if one has enough information to piece together mathematically. It’s not really necessary for the above question that may be solved by in- formed “trial and error”, but we will take the opportunity of showing the technique here.

We have two related pieces of information:

1. Mary has twice as many brothers and sisters

2. John has twice as many brothers as sisters

We can express each of these with symbols and numbers. We use symbols as a shorthand code.

Here we will use the letter B to represent the number of boys and the letter G to represent the number of girls

1. “Mary has twice as many brothers and sisters” can be expressed symbolically.

The number of sisters Mary has is G-1. This is because Mary is a girl and therefore her number of sisters is the number of girls in the family minus one (herself). The number of brothers is the number of boys (B) and this is twice the number of sisters (2x(G-1)).

B =2(G-1), which multiplies out as

B = 2G – 2 (which we will call equation 1(eqn 1))

Likewise,
2. “John has twice as many sisters as brothers” can be expressed as
G = 2(B-1), which multiplies out as
G = 2B – 2 (which we will call equation 2(eqn 2))

Because both of these mathematical equations describe the same situation they can be combined.

If we take (eqn 1) B =2G-2 and insert this expression for B into (eqn 2) G = 2B-2, we get:

G = 2(2G-2) – 2
Which multiplies out as
G = 4G – 4 -2
Which is
G = 4G -6
If we subtract G from both sides
0 = 3G – 6
And if we add 6 to each side we get
3G = 6
And if 3G = 6 then G must equal 2.

Therefore, the number of girls is 2.

Going back to equation 1:

B=2G-2

And putting in G=2
B = 2(2) – 2
B=4-2
B=2

So there are 2 boys and 2 girls in the family.

**Wednesdays Walls of Derry Puzzle:**

**1st Ciara**

**2nd Don**

**3rd Anne**

**4th Eilis**

**5th Bill**

**Thursdays Farmer cabbage wolf and Goat puzzle:**

Farmer takes Goat across (leaving Wolf and Cabbage behind)
Farmer returns alone
Farmer takes Wolf across
Farmer returns with Goat

\* We now have the Farmer, the Cabbage and the Goat on one side and the Wolf on the other side

Farmer takes Cabbage across
Farmer returns alone
Farmer takes Goat across

DONE!

**Fridays Space Mission Puzzle**

**Answer: week 11**