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**#THIS  
IS THE  
PLACE**

# COMPETITION

**MATHS**

**Are you a keen Mathematician?**

Below are 4 Problems from different areas of mathematics.

Have a go at solving them and send your answers to [maths@leggott.ac.uk](mailto:maths@leggott.ac.uk) by 1st February!

The best answer will win a Casio CLASSWIZ calculator and an Amazon voucher!

### QUESTION ONE

Prove that  $n(n + 1)(n + 2) - n(3n + 2)$  is always a cube number.

(Show your workings out)

### QUESTION TWO

**A)** Twelve friends meet and shake hands with each other. How many handshakes were there altogether in this exchange of greetings?

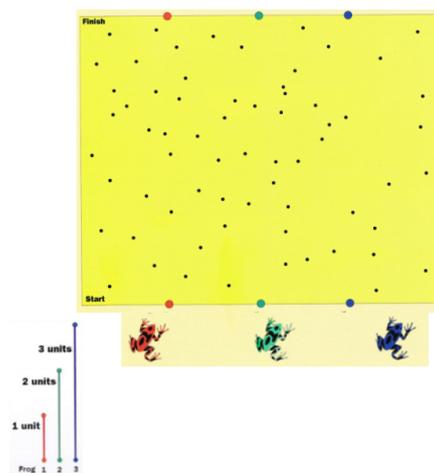
**B)** At the board meeting there were 17 members, each of whom is supposed to shake hands with every other person. But four members did not shake hands with each other. How many handshakes did happen?

### QUESTION THREE

A safe has 4 dials, each with 26 letters of the alphabet, and is opened by a four-letter code, in which each letter can be used only once. The order matters, so XBFG is different to GXBF. If it takes 5 seconds to try each possible combination, how long would it take to try them all?

### QUESTION FOUR

Three frogs crossed the field in a series of equal-distance jumps. The red frog's jumps were always 1 unit, the green frog's jumps 2 unit's and the blue frog's 3 units. They had to cross the field in zigzagging jumps because of many obstacles. The black spots represent the places they can land. How many jumps did each frog need to reach its' destination?



*We hope you have picked a subject you are interested in and enjoy your time researching.*

*Please submit your entries to [Maths@leggott.ac.uk](mailto:Maths@leggott.ac.uk), with the subject title as 'Maths Competition'.*