AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES
SCHOOLS ENRICHMENT CENTRE (AIMSSEC)
AIMING HIGH

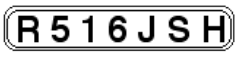
NUMBER PLATE CODE

My car has number plate – S208VBJ.

Using my special code S208VBJ adds to 65.

These plates all add to 65 using my code!

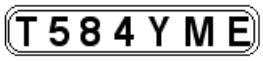
Using the code every character, that is a digit or a letter, is separate.



Numbers are simply added together so that, in the first number plate 208 is 2 + 0 + 8 = 10.

Letters are translated into numbers. If you know the value of F and H you not only know the value of G, but can easily work out all the rest of the alphabet.

Can you crack my code and use it to find out what both of these number plates add up to?

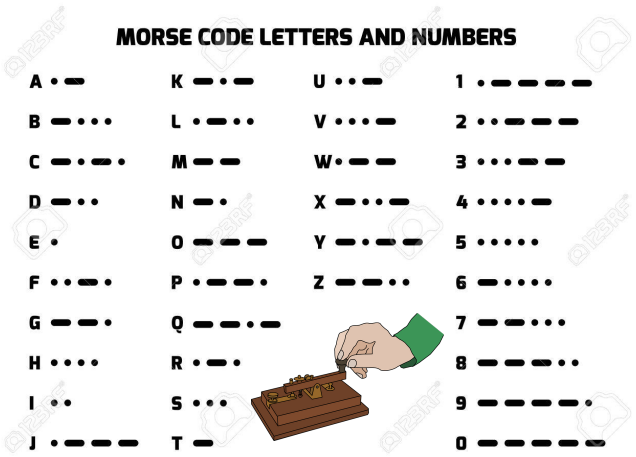


Help

Start by writing out the numbers on the number-plates and adding up each one.
Then write out the alphabet and think of a way of varying A = 1, B = 2 etc. where each letter is replaced by a number in an obvious way.

Sending secret messages that the enemy will find difficult to read has been important throughout history especially in wartime. In modern times mathematics plays a big part in security codes that protect financial transactions and other secrets. Such codes often use the product of very large prime numbers.

Extension



These are not secret codes, rather they show how communication has changed in 100 years. The first transatlantic telephone calls used morse code. Now we have instant messaging around the world by computers using binary code.

Can you invent your own code or do some arithmetic using binary numbers. These are numbers written in base 2 using only 1s and 0s so, for example, 1000 represents the number 2^3 and not 10^3. Can you work out the answer to this addition sum?

$$\begin{array}{r} 11111 \\ +\ 1000 \\ \hline \end{array}$$

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Cryptographic Devices: https://www.youtube.com/watch?v=5fdA1JIZaFM
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