



## Problem of the Week

### Problem B

#### Don't Be Square...Give Me a High Five!

#### Problem

- a) These numbers belong in a group: 25, 40, 115, 55.  
These numbers do not belong in this group: 33, 71, 4, 106.
- Which of these numbers belong in this group: 75, 205, 87, 43?
  - What is the rule which describes numbers in this group?
- b) These numbers belong in another group: 42,18,108,462.  
These numbers do not belong in this group: 21, 46, 99, 104.
- Which of these numbers belong in this group: 63, 84, 118, 456?
  - What is the rule which describes numbers in this group?
- c) In simple codes, a number is assigned to each letter of the alphabet by a rule known to the decoder. For example, suppose the rule is to multiply the letter's order in the alphabet by 5. Then the first three words of the title of this problem, encoded according to this rule, would give  
207570100 1025 958510559025 for "Don't Be Square".  
Decode the following sentence, which was encoded according to the same rule:  
1154510040 6551004095 12575105 15570 2075 57012510040457035
- d) Make up your own coding rules, and use them to code the title of this problem. Trade rules with a classmate and decode each other's result as a check.

#### Solution

- a) The rule appears to be that the numbers in this group are each multiples of 5. Thus  $75 = 15 \times 5$  and  $205 = 41 \times 5$  belong to this group, while 87 and 43 do not.
- b) The rule in this part is not as obvious. However, it appears to be that the numbers in this group are each multiples of 6. Thus  $84 = 14 \times 6$  and  $462 = 77 \times 6$  belong to this group, while 63 and 118 do not. (Some may have thought that the numbers in this group were all even. However, if you look at the given numbers not in the group, you will see even numbers,)





c) The decoded sentence is “With maths you can do anything”.

A table similar to the following may have been helpful in your decoding process.

Letter	A	B	C	D	E	F	G	H	I	J	K	L	M
Position Value	1	2	3	4	5	6	7	8	9	10	11	12	13
5×(Position Value)	5	10	15	20	25	30	35	40	45	50	55	60	65
Letter	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Position Value	14	15	16	17	18	19	20	21	22	23	24	25	26
5×(Position Value)	70	75	80	85	90	95	100	105	110	115	120	125	130

Then you can use the table to help split the digits to match the appropriate values in the table.

115	45	100	40	65	5	100	40	95	125	75	105	
W	I	T	H	M	A	T	H	S	Y	O	U	
15	5	70	20	75	5	70	125	100	40	45	70	35
C	A	N	D	O	A	N	Y	T	H	I	N	G

La solution pour le problème en français est : Tu as bien réussi

d) Answers will vary depending on the coding rule chosen by each student.

