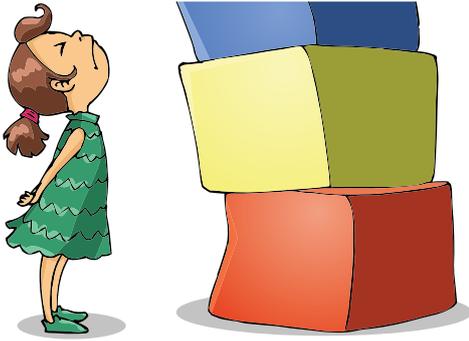


# FIVE PROBLEMS

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These problems are chosen from puzzleup.com 2015 (weekly puzzle competition prepared by Emrehan Halici) for G4G12



## 01 - COLORED CUBES

You have red, blue and green unit cubes. You will create a  $2 \times 2 \times 2$  cube by using 8 of these unit cubes. What is the maximum number of different cubes you can create?

Note: If a cube can be obtained by rotating another one, these two cubes are not considered to be different.

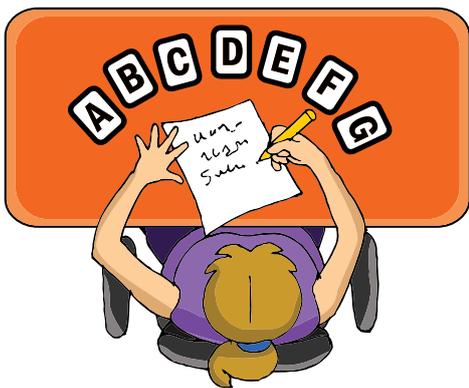
If the problem was asked for only red and blue unit cubes, the answer would be 23..



## 02 - WINNING NUMBER

Five numbers will be randomly picked with replacement between 1 and 100 (1,2,...,99,100), and the largest of these five numbers will be named as the winning number. This process will be repeated many times and the average of all the winning numbers will be calculated.

What is the integer nearest to this average?



## 03 - SET OF CODES

You will produce a set of 7-letter codes using the the letters A, B, C, D, E, F and G.

- Two codes are called similar if they differ by just one letter.
- No two codes will be similar in the set.
- Letters can be used more than once in a code.

What can be the maximum number of codes in this set?

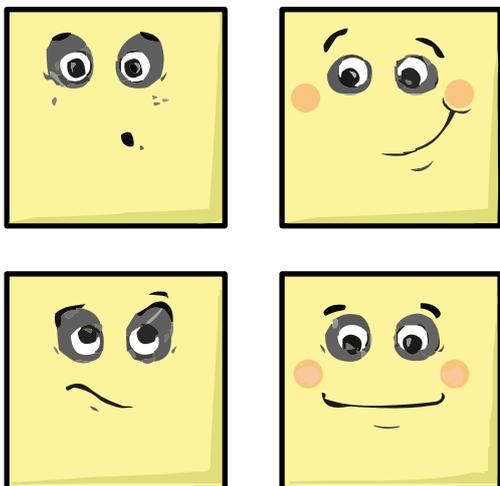
If the problem was asked for a set of 3-letter codes using the letters A, and B then the answer would be 4 (Example: AAA, ABB, BAB, BBA).



## 04 - HANDS OF A CLOCK

How many times at least two of the three hands (hour, minute, second) of a clock exactly overlap between 10:30 and 22:30?

Note: All hands move in a continuous motion with no discrete jumps.



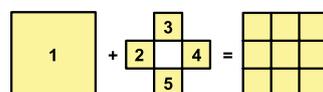
## 05 - SQUARES

What is the minimum number of squares to be drawn on a paper in order to obtain an  $8 \times 8$  table divided into 64 unit squares.

Notes:

- The squares to be drawn can be of any size.
- There will be no drawings outside the table.

Two examples for a  $3 \times 3$  table:



The second one with 4 squares is the solution for a  $3 \times 3$  table.

