1. Special Numbers.

$32\,043^2 =$ $99\,066^2 =$

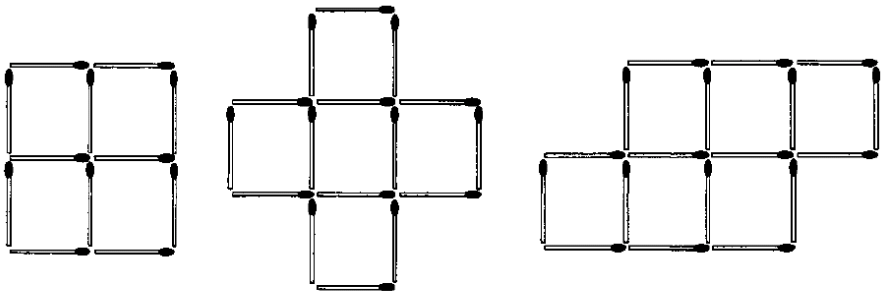
$11\,826^2 =$ $19\,377^2 =$ $12\,543^2 =$ $19\,629^2 =$

$15\,681^2 =$ $23\,178^2 =$ $18\,072^2 =$ $29\,034^2 =$

$987\,654\,321 - 123\,456\,789 =$

2.

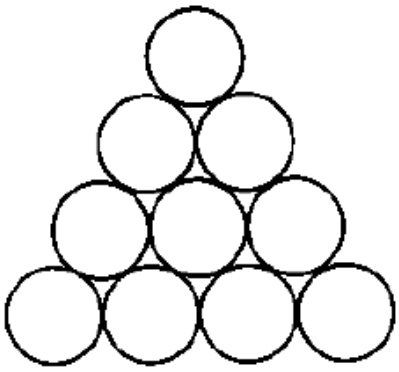
In each of the arrangements of matchsticks, change the position of, but do not remove, four matches to make an arrangement of three squares.



(a) (b) (c)

3.

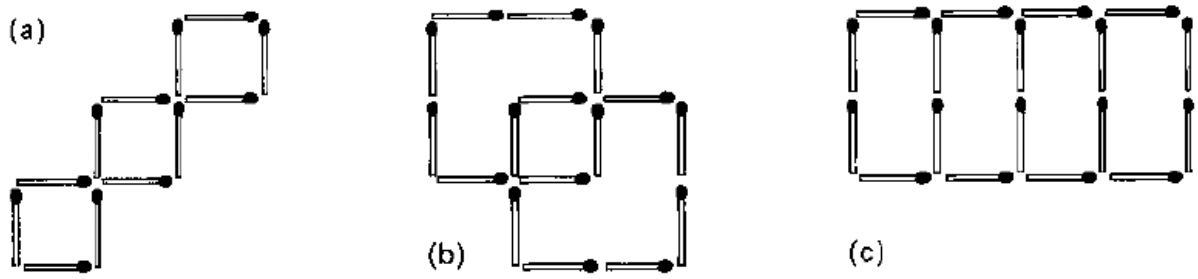
Arrange ten coins or counters to form a triangular array as shown. What is the smallest number of coins you can remove from this array so that no three coins have their centres at the vertices of an equilateral triangle?



4.

Find a way of cutting up the regular pentagon into four isosceles triangles which can be rearranged to form the symmetric trapezium shown.

Key 1.



2.

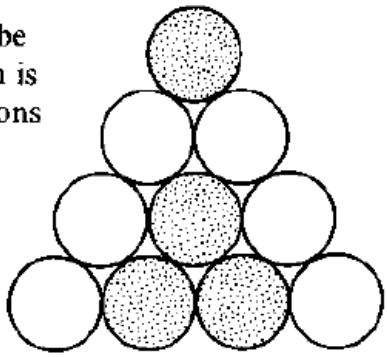
$1\,026\,753\,849 = 32\,043^2$
$9\,814\,072\,356 = 99\,066^2$

$11\,826^2 = 139\,854\,276$ $\quad$ $19\,377^2 = 375\,468\,129$
$12\,543^2 = 157\,326\,849$ $\quad$ $19\,629^2 = 385\,297\,641$
$15\,681^2 = 245\,893\,761$ $\quad$ $23\,178^2 = 537\,219\,684$
$18\,072^2 = 326\,597\,184$ $\quad$ $29\,034^2 = 842\,973\,156$

$987\,654\,321 - 123\,456\,789 = 864\,197\,532$

3.

Only four coins need to be removed, and the pattern is unique apart from rotations or reflections.



4.

An isosceles dissection