

Problem avdelningen

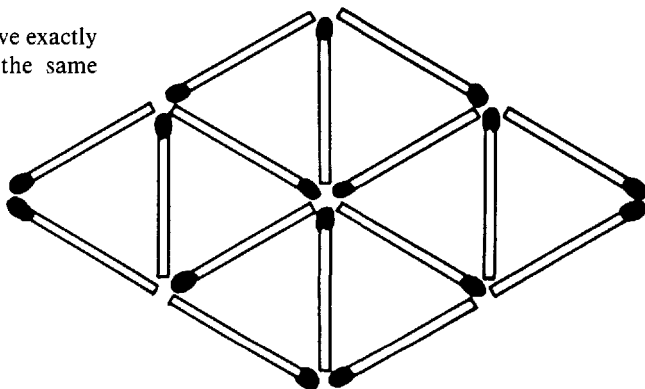


Problemavdelningen denna gång har blivit The English Corner. Problemen är hämtade ur *More mathematical activities* av Brian Bolt. För er som vill ha fler problem av denna typ hänvisas också till B Bolt: *Boken om aktiviteter i matematik*, Gothia, 1984.

Good luck!

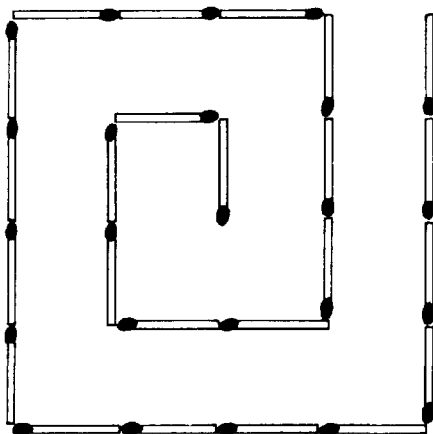
1209 Mystifying matchsticks

Take away four matchsticks to leave exactly four equilateral triangles all of the same size.

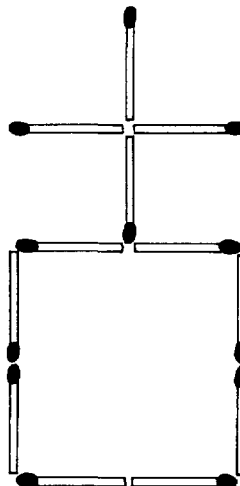


1210 More matchstick mindbenders

Turn the spiral into three squares by moving four matches.



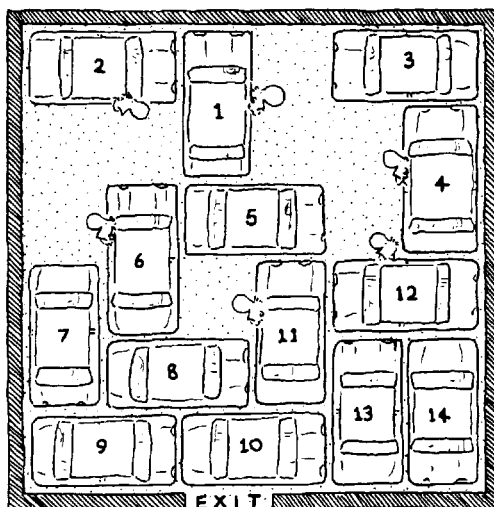
Convert this "church with tower" symbol into three identical squares by moving five matches.



1211 The car jam

In a small underground private car park in the centre of London the cars were packed in like sardines. So tightly were the cars parked that the only way a car could be moved was to push it forwards or backwards along its length. The car marked 1 in the diagram belonged to the managing director of the firm owning the car park. He was in a hurry to get out! Help the car park attendant by finding the minimum number of car moves required for car 1 to be released from the jam it is in.

A set of dominoes makes a very handy visual aid when trying to solve this puzzle.

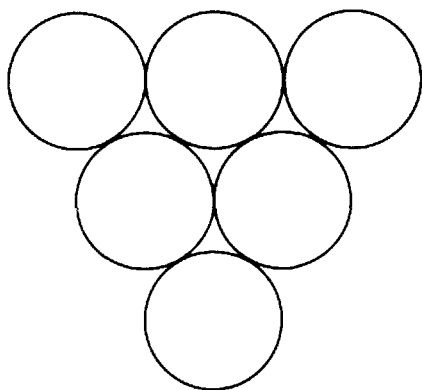


$$\begin{array}{r}
 A B C \\
 A B C \\
 + A B C \\
 \hline
 B B B
 \end{array}$$

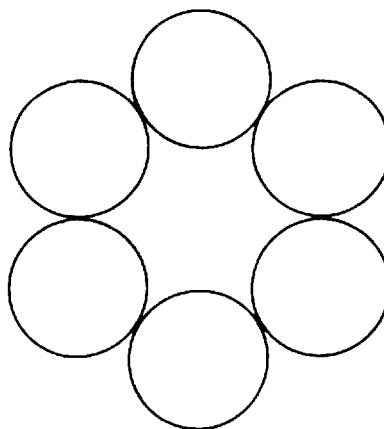
1212 As easy as ABC

Find A , B and C to make the adjoining addition sum correct.

1213 Ring the triangle



(a)



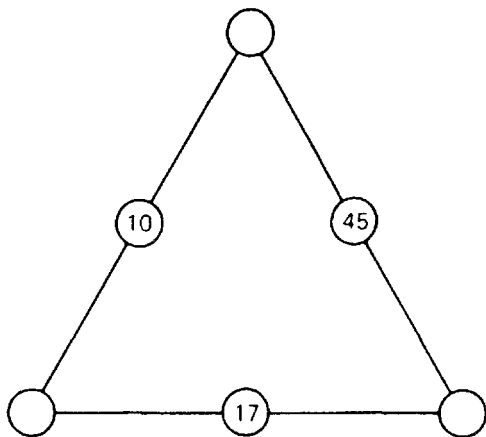
(b)

Make a triangle of six pennies as shown in (a). What is the smallest number of pennies you can move by sliding to form the ring of pennies as in (b), if every time a penny is moved it must be put into contact with two other pennies? Note you are not allowed to push one coin with another.

1214 Fill the corners

Find three numbers to put in the circles at the corners of this triangle so that the total of the numbers along each side is the same.

There are many solutions. How are they related to each other?

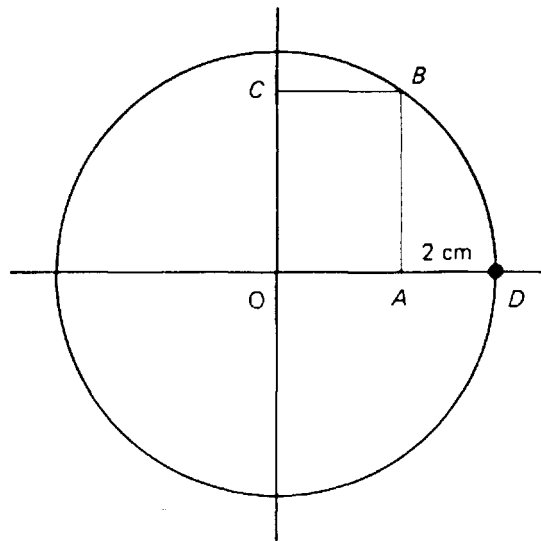


1215 Find the radius of the circle

The rectangle $ABCO$ has one vertex at O , the centre of a circle, and a second vertex A is 2 cm from the edge of the circle.

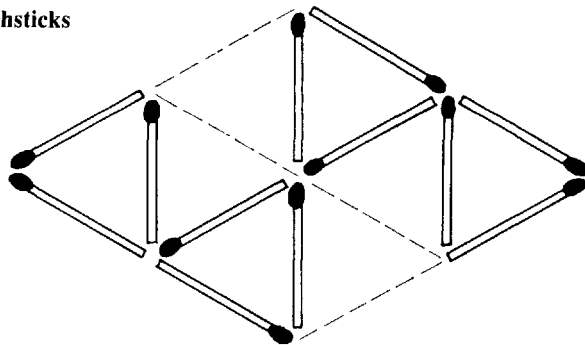
The vertex A is also a distance of 7 cm from C .

What is the radius of the circle?

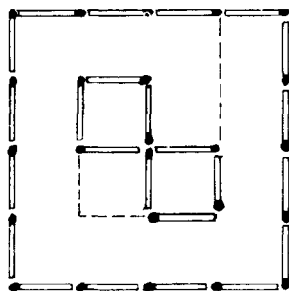


COMMENTARY

1209 Mystifying matchsticks

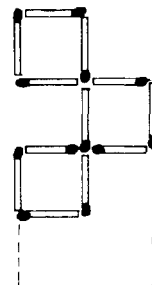
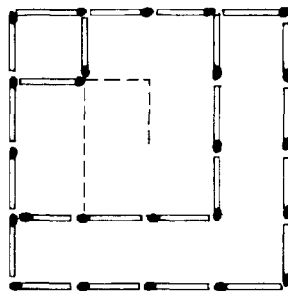


1210 More matchstick mindbenders



Spiral to squares

or



Church to squares

1211 The car jam

Take the width of a car as 1 unit, its length as 2 units, and L, R, U, D to mean left, right, up, down respectively.

Then car 1 will be released by the following car moves: 3(L1), 4(U1), 5(R2), 11(U2), 6(U1), 7(U2), 12(L4), 8(L1), 13(U1), 10(R1), 1(D6). The key to the solution is to appreciate that 10 must move to the right which can only be achieved by moving 13 up, which in turn requires that 12 moves left etc.

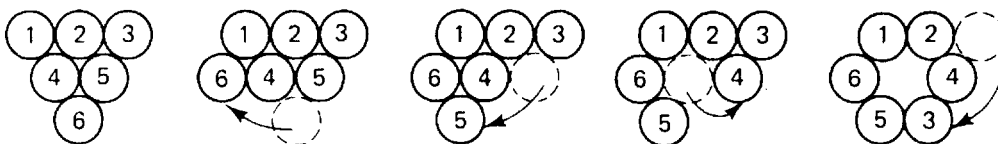
Try making similar puzzles of your own.

1212 As easy as ABC

Intelligent use of trial and error starting with possible values for A and deducing possible values for B soon leads to the solution $A = 1$, $B = 4$, $C = 8$. This is the only solution unless you count $A = B = C = 0$.

$$\begin{array}{r} 148 \\ 148 \\ +148 \\ \hline 444 \end{array}$$

1213 Ring the triangle



1214 Fill the corners

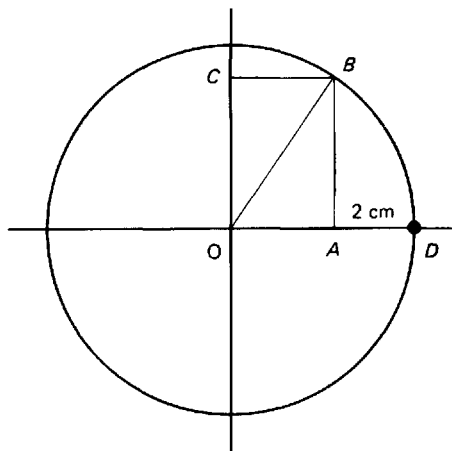
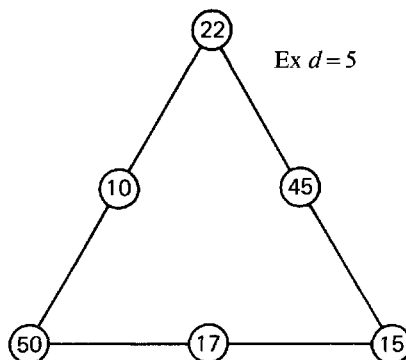
The simplest solution is to fill the circle in a corner with the number in the middle of the opposite side. Each side will then contain 10, 17 and 45 so have a total of 72. All other solutions are obtained by increasing these numbers by the same increment d , so the general solution will be of the form

top corner, $17 + d$;

left hand corner, $45 + d$;

right hand corner, $10 + d$

giving a total along each side of $72 + 2d$. d can of course be positive or negative.



1215 Find the radius of the circle

Nothing to it unless you are misled by the surplus information. As $ABCO$ is a rectangle $OB = AC = 7$ cm so the radius of the circle is 7 cm.

What does the length AD determine? Can it have any positive value?