

MAKO Puzzles

In How Many Points Can Six Lines Meet?

Given six infinite straight lines in the plane, no three through the same point, what are the possible numbers of intersection points? For example, with three lines, the possibilities are 0 (three parallel lines), 2 (two parallel lines and a transversal), or 3 (no lines parallel). Note that 1 cannot occur because of the restriction that no three lines pass through the same point.

The possible numbers of intersection points are 0, 5, 8, 9, 11, 12, 13, 14, and 15.

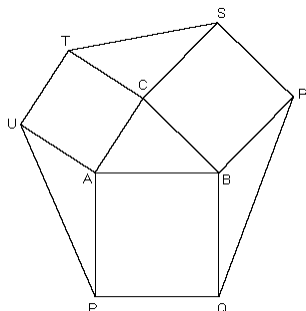
Which Value Gives a Unique Solution?

For which value of $a > 1$ does the equation $a^x = x$ have a unique solution?

$$a = e^{1/e}$$

Find the Area of the Hexagon

In the figure below, $AB=7$, $BC=6$, and $CA=5$. The quadrilaterals $ABQP$, $BCSR$, and $CAUT$ are all squares. Find the area of the hexagon $PQRSTU$.



$110 + 24\sqrt{6}$ or approximately 168.788 square units

A Classic Problem from the late John H. Conway

There is a 10-digit decimal number, $abcdefghij$. Each of the digits is different, and they have the following properties:

- a is divisible by 1
- ab is divisible by 2
- abc is divisible by 3
- $abcd$ is divisible by 4
- $abcde$ is divisible by 5
- $abcdef$ is divisible by 6
- $abcdefg$ is divisible by 7
- $abcdefgh$ is divisible by 8
- $abcdefghi$ is divisible by 9
- $abcdefghij$ is divisible by 10

Find it. **3816547290**