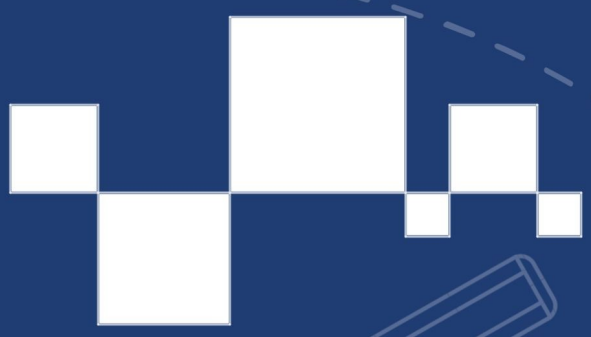
## ZIML Division E

Several squares of different sizes are arranged in a line of length 13 as shown in the diagram below.



What is the sum of the perimeter of all squares?

## ZIML Junior Varsity

Consider the 9 numbers

$$1, 2, 3, 11, 22, 33, 111, 222, 333.$$

How many arrangements of these numbers are there so that the product of any two consecutive numbers is divisible by 3?

## ZIML Masters

Find the set of all positive integers $n$ such that

$$1^n + 2^n + 3^n + 4^n + 5^n + 6^n$$

is a multiple of 7.

## ZIML Division M

The sum of eleven consecutive even numbers is 638. What is the second smallest number?

## ZIML Division H

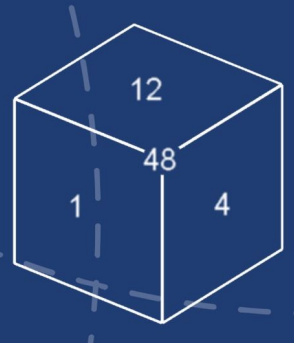
Simplify the sum

$$\frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \cdots + \frac{1}{\sqrt{99}+\sqrt{100}}.$$

Round your answer to the nearest tenth if necessary.

## ZIML Varsity

A positive integer is written on each face of a cube. Each vertex is then assigned the product of the numbers written on the three faces intersecting the vertex, with a partial example shown below.




The sum of the numbers assigned to all the vertices is equal to 2015. Find the sum of the numbers written on the faces of the cube.