

Lesson 1 Homework Answers

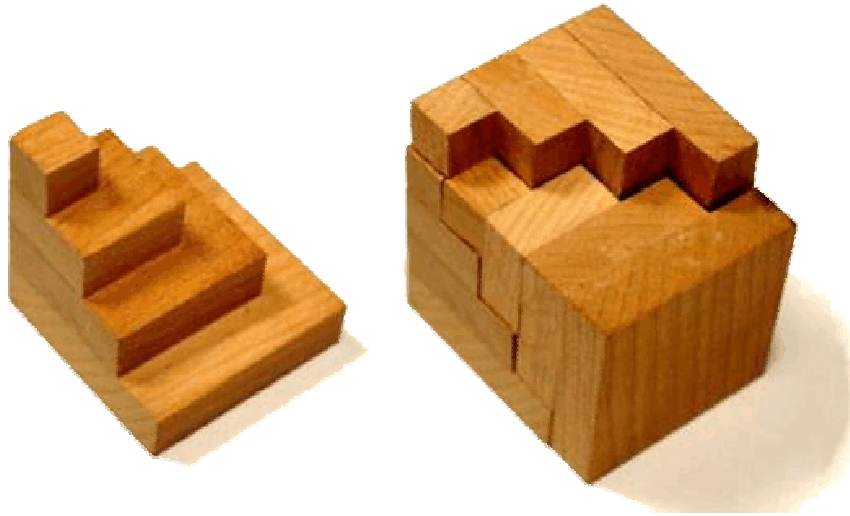
1. $1+2+3+\dots+256 = (256)\times(257)/2 = 32896$

2. for $n = 10$, $n\times(n+1)\times(n+2)/6 = 10\times 11\times 12/2 = 660$

3. Pyramidal numbers: 1, 4, 10, 20, 35

n th hyperpyramidal number: $\frac{n\times(n+1)\times(n+2)\times(n+3)}{1\times 2\times 3\times 4} = \frac{n\times(n+1)\times(n+2)\times(n+3)}{24}$

4.



Three square pyramids (see left picture) can be put together to form a rectangular block $n\times n\times(n+1)$ with a staircase left over (see right picture). But the staircase is the triangular number $n\times(n+1)/2$. Therefore the volume of the three pyramids is $n\times n\times(n+1) + n\times(n+1)/2$, and the volume of one square pyramid is $[n\times n\times(n+1) + n\times(n+1)/2]/3$. For the case of $n = 4$ shown,

$$1 + 4 + 9 + 16 = [4\times 4\times 5 + 4\times 5/2]/3 = 30$$

5.

n	$2n - 1$	odd numbers	sum
1	1	1	1
2	3	1, 3	4
3	5	1, 3, 5	9
4	7	1, 3, 5, 7	16
5	9	1, 3, 5, 7, 9	25

It looks like $1 + 3 + 5 + 7 + \dots + (2n - 1) = n^2$

6.

