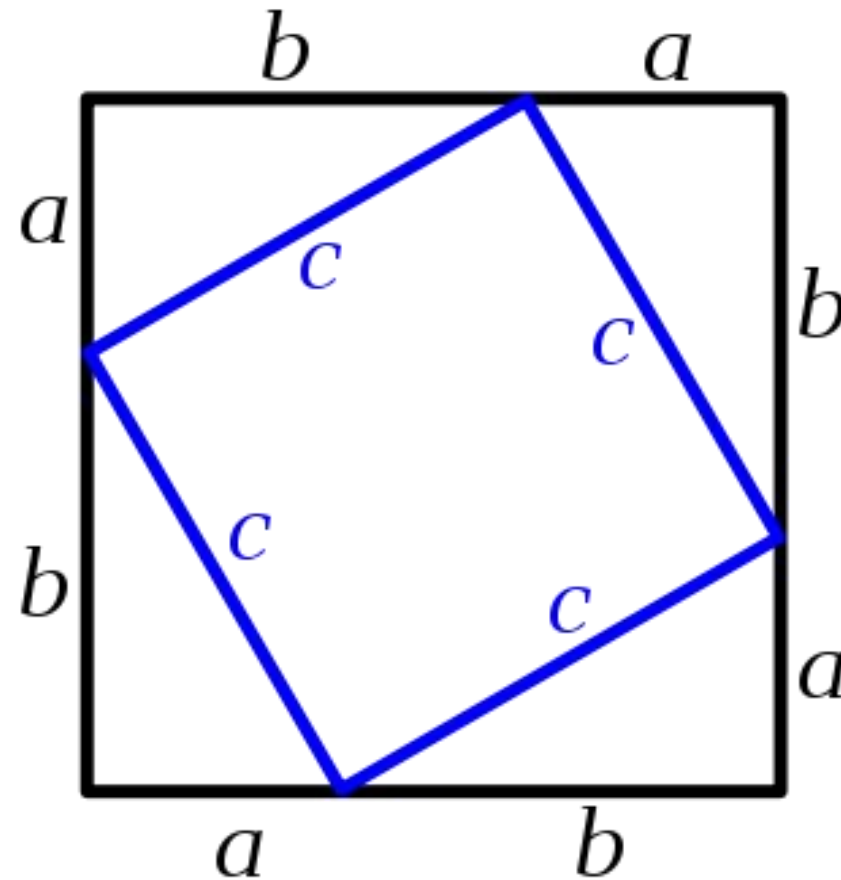


# More proof exercises

- **Pigeonhole Principle:** If  $n+1$  balls are distributed among  $n$  bins then at least one bin has more than 1 ball
- **Generalized Pigeonhole Principle:** If  $n$  balls are distributed among  $k$  bins then at least one bin has at least  $\lceil n/k \rceil$  balls

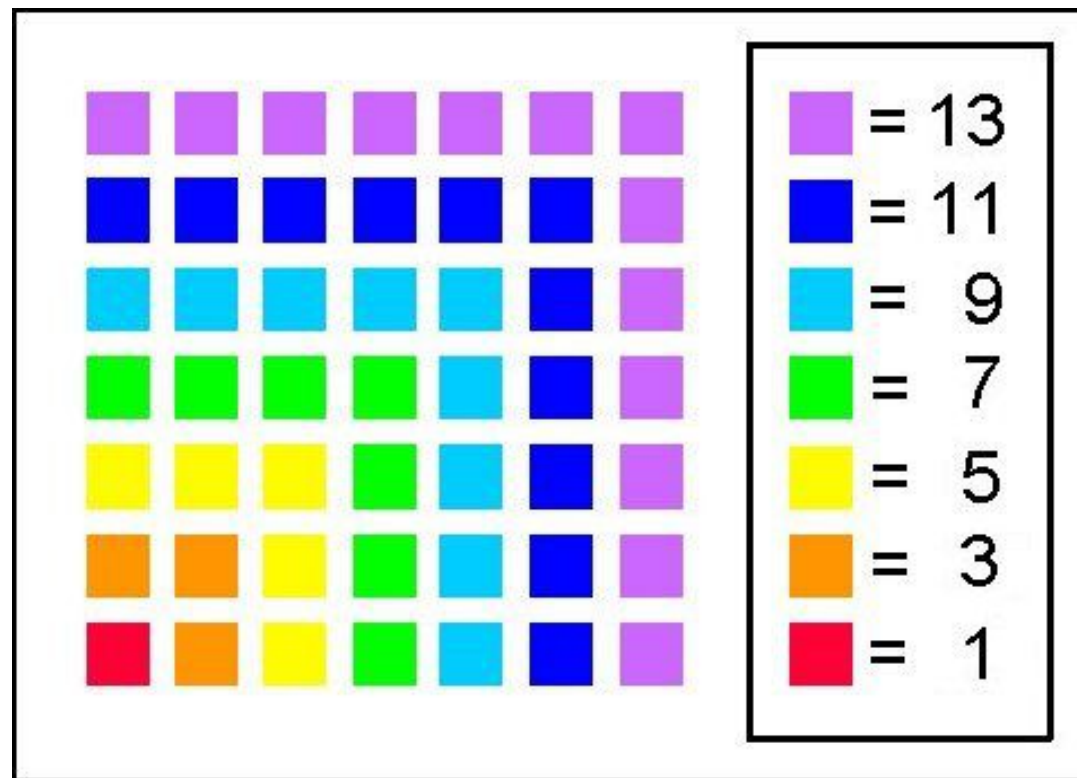
# Meaningful diagrams

- Pythagoras



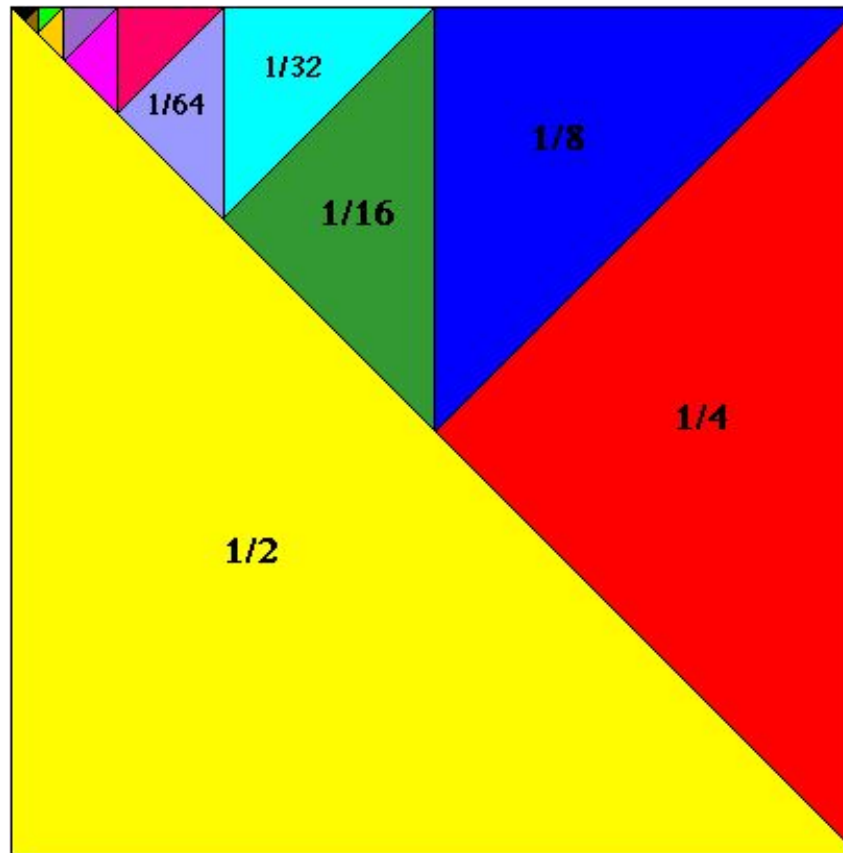
# Meaningful diagrams - 2

- Sum of an arithmetic series (from <http://www.tonydunford.com/images/math-and-geometry/sum-of-number-series/SumOfOdd.jpg>)



# Meaningful diagrams - 3

- Sum of a geometric series (from <http://math.rice.edu/~lanius/Lessons/Series/one.gif>)



# Meaningful diagrams - 4

- $\frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \frac{1}{256} + \dots = \frac{1}{3}$

(from [http://www.billthelizard.com/2009/07/six-visual-proofs\\_25.html](http://www.billthelizard.com/2009/07/six-visual-proofs_25.html))

