

Visual Mathematics

“I See Dead Easy Proofs”

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$$\Rightarrow \tilde{m}_j \ddot{q}_j + \tilde{c}_j \dot{q}_j + \tilde{k}_j q_j = \phi_{j1} P_1 + \phi_{j2} (P_2 + k_d u_d + c_d \dot{u}_d)$$

$$\left[\begin{array}{l} \tilde{m}_1 \ddot{q}_1 + \tilde{c}_1 \dot{q}_1 + \tilde{k}_1 q_1 = \phi_{11} P_1 + \phi_{12} (P_2 + k_d u_d + c_d \dot{u}_d) \\ \tilde{m}_2 \ddot{q}_2 + \tilde{c}_2 \dot{q}_2 + \tilde{k}_2 q_2 = \phi_{21} P_1 + \phi_{22} (P_2 + k_d u_d + c_d \dot{u}_d) \end{array} \right]$$

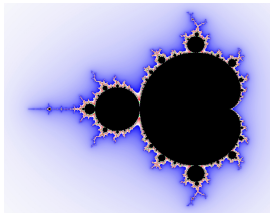
$$\frac{u_d}{\phi_{12}} = q_1 \quad \leftarrow \Omega \approx \omega_1$$

$$q_1 = \frac{u_d}{\phi_{12}}$$

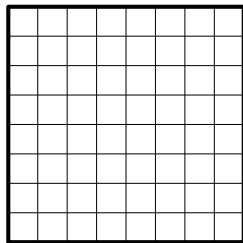
Mathematics is no more about formulas than astronomy is about telescopes



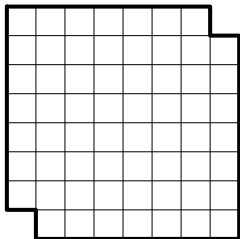
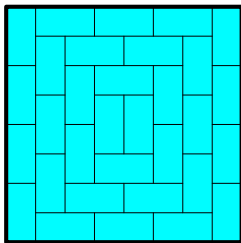
$$\text{let } f_c(z) = z^2 + c \text{ in} \\ \left\{ z \mid \lim_{n \rightarrow \infty} f_z^n(0) \not\rightarrow \infty \right\}$$



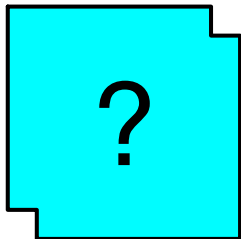
Warm-up puzzle

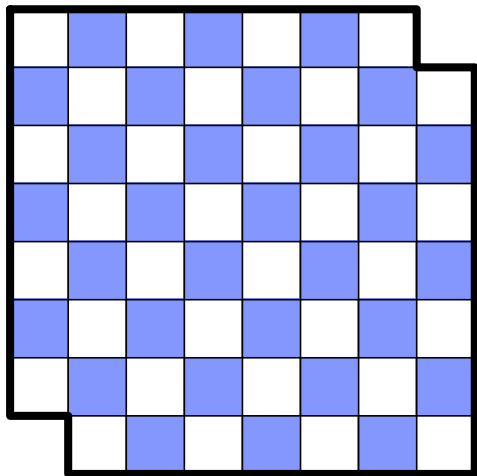



+ 32 x 




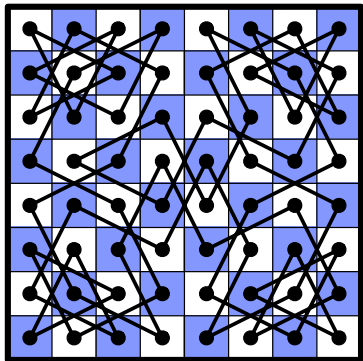
+ 31 x 





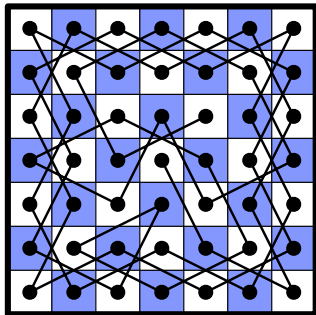




32 x 

30 x 

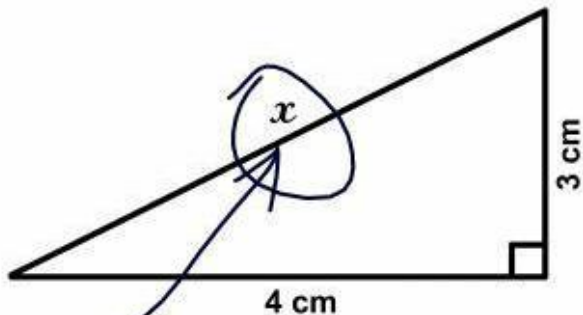


32 x  32 x 

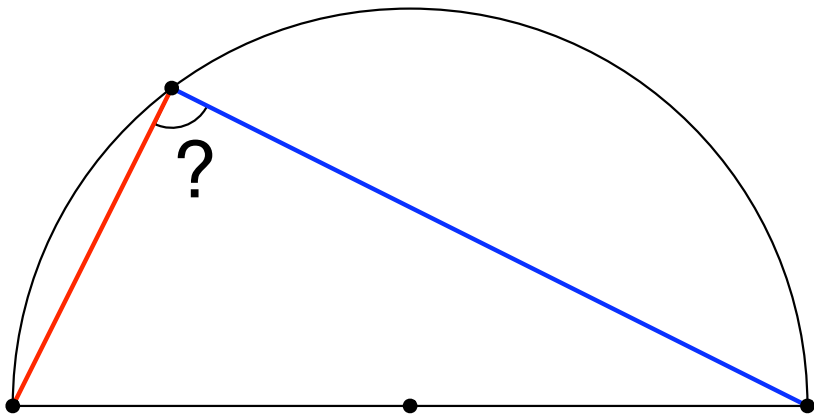


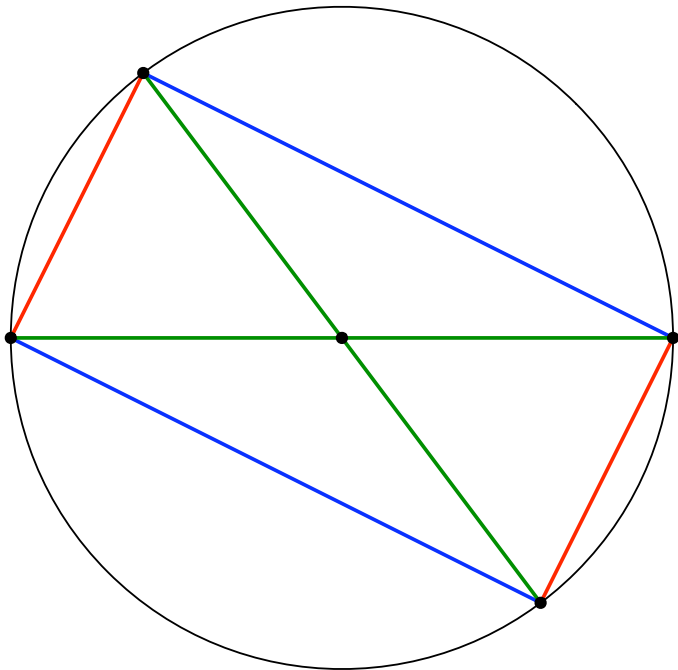
25 x  24 x 

3. Find x .



Here it is







$$1 = 1 = 1 \times 1$$

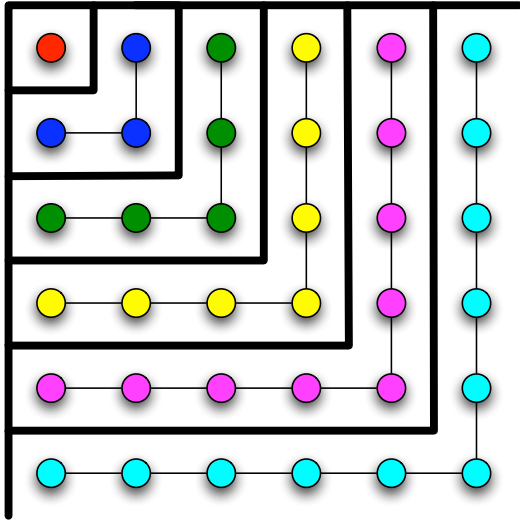
$$1 + 3 = 4 = 2 \times 2$$

$$1 + 3 + 5 = 9 = 3 \times 3$$

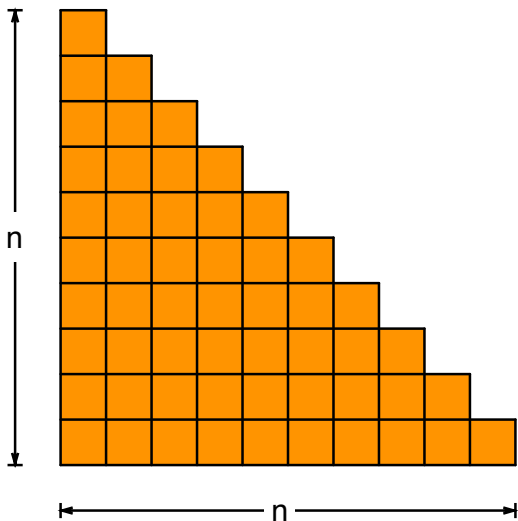
$$1 + 3 + 5 + 7 = 16 = 4 \times 4$$

$$1 + 3 + 5 + 7 + 9 = 25 = 5 \times 5$$

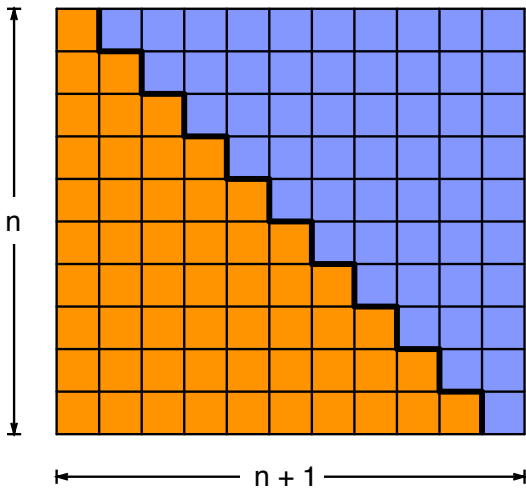
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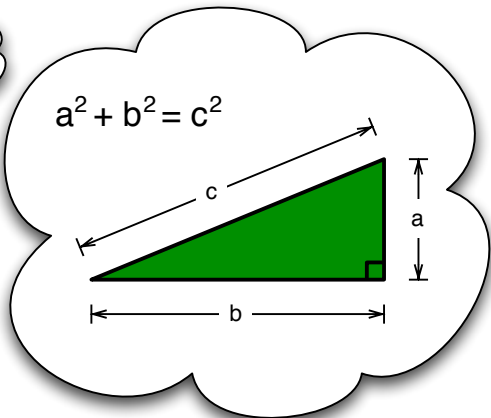
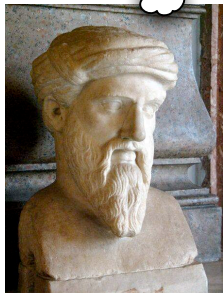
$$1 + 2 + 3 + \dots + n = ?$$

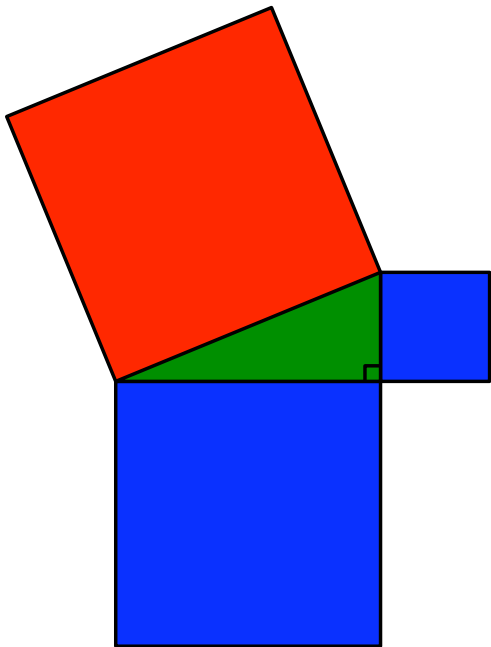


$$1 + 2 + 3 + \dots + n = \frac{1}{2} \times n \times (n + 1)$$



Pythagoras' Theorem



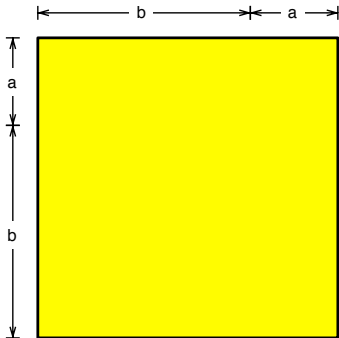


blue area

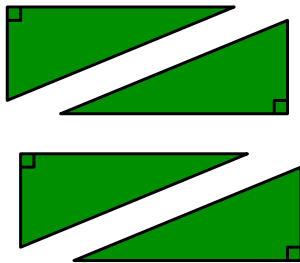
=

red area

For this proof you will need:

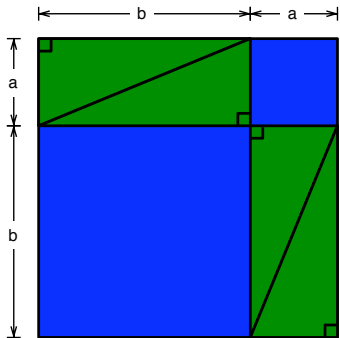


1 x $(a + b)$ -sided square

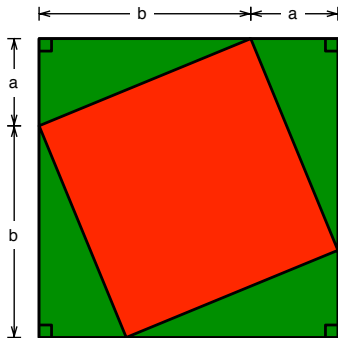


4 x right-angled triangle

Assemble the proof (twice):



Left over space
= **blue area**



Left over space
= **red area**

Thank you for your attention

