Lecture 12

Dot Product

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Mini Exam

Questions about Makeup?

Dot Product

$\langle 3,4,1 \rangle \cdot \langle 1,2,1 \rangle = ?$

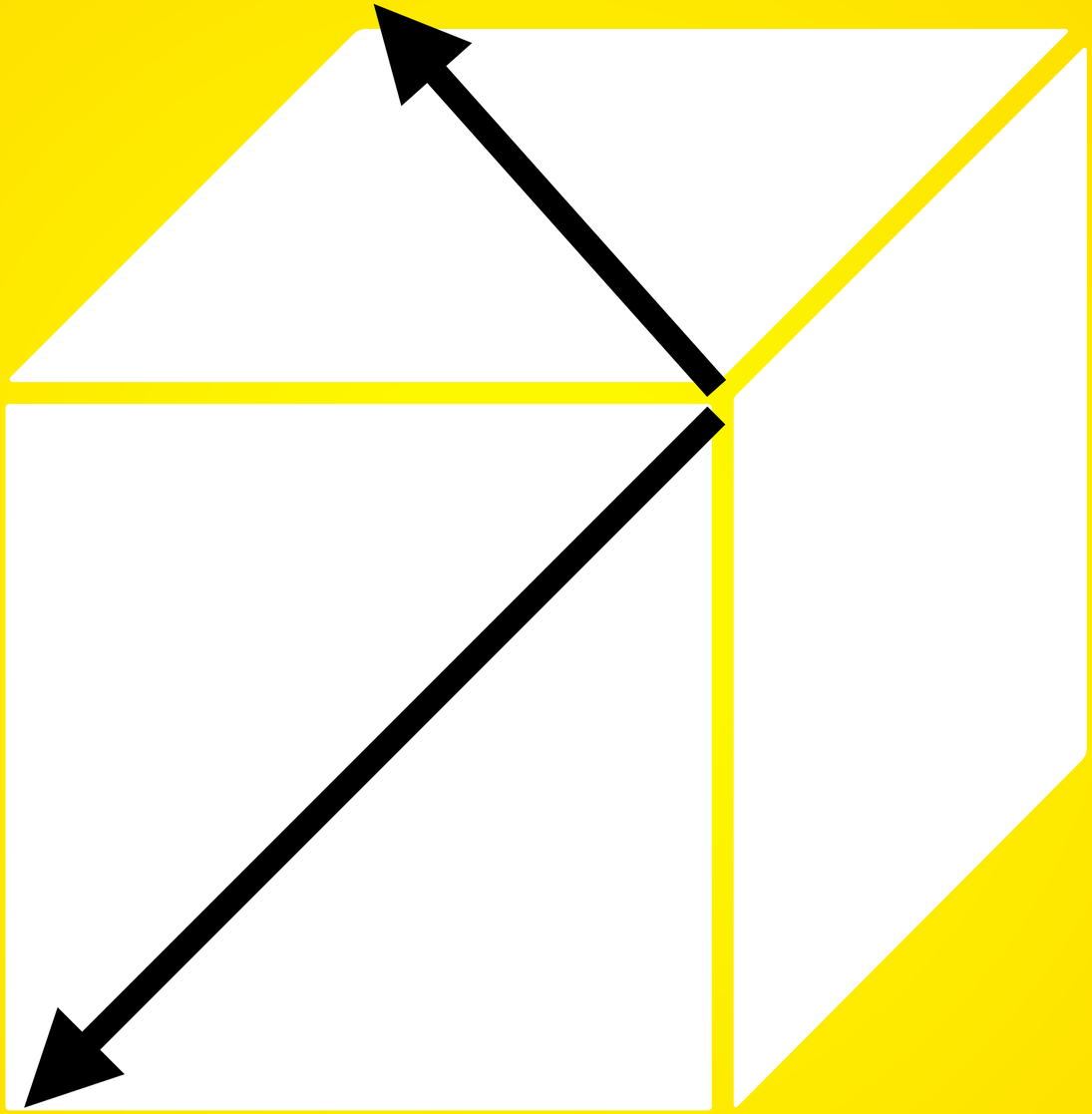
Cauchy Schwarz

$$|\vec{v} \cdot \vec{w}| \leq \|\vec{v}\| \, \|\vec{w}\|$$

Angles

$$\vec{v} \cdot \vec{w} = \|\vec{v}\| \, \|\vec{w}\| \cos(\alpha)$$

$$\cos(\alpha) = \frac{\vec{v} \cdot \vec{w}}{\|\vec{v}\| \|\vec{w}\|}$$



Cos Formula

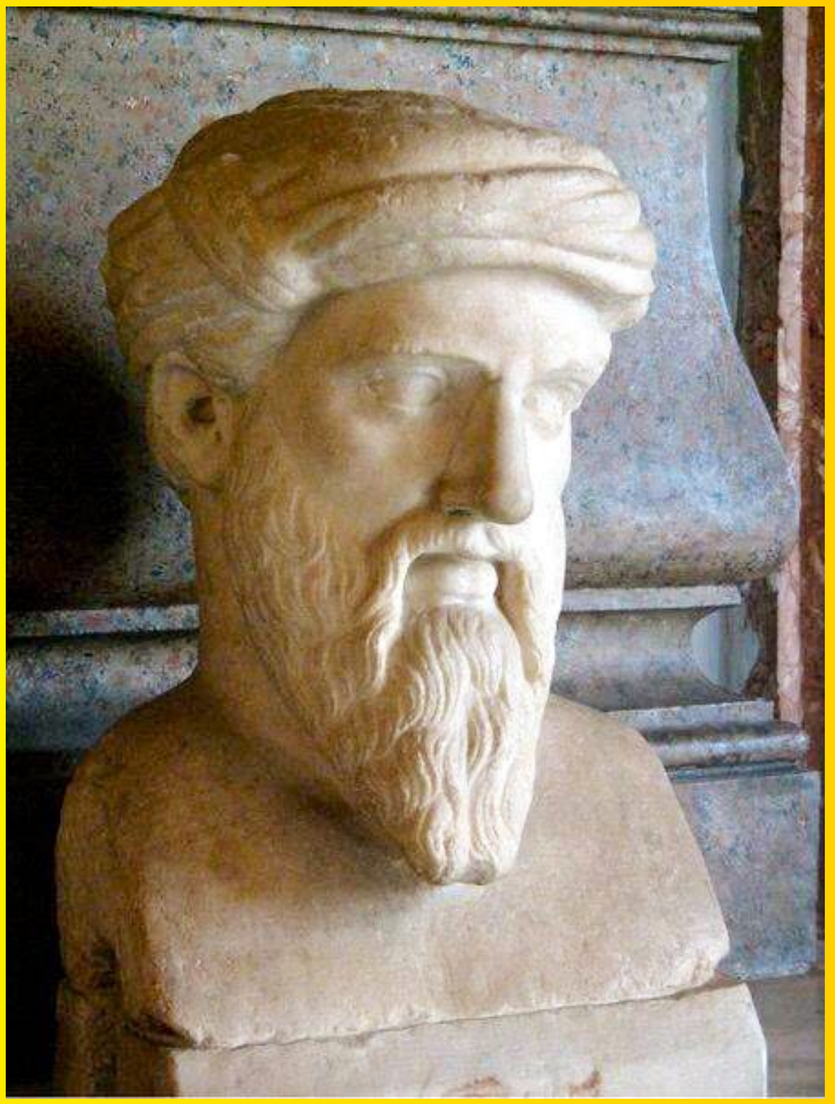
$$(\vec{v} - \vec{w}) \cdot (\vec{v} - \vec{w}) = \|\vec{v}\|^2 + \|\vec{w}\|^2 - \|\vec{v}\| \ \|\vec{w}\| \cos(\alpha)$$

$$c^2 = a^2 + b^2 - 2ab\cos(\alpha)$$

Pythagoras

$$c^2 = a^2 + b^2$$

Pythagoras



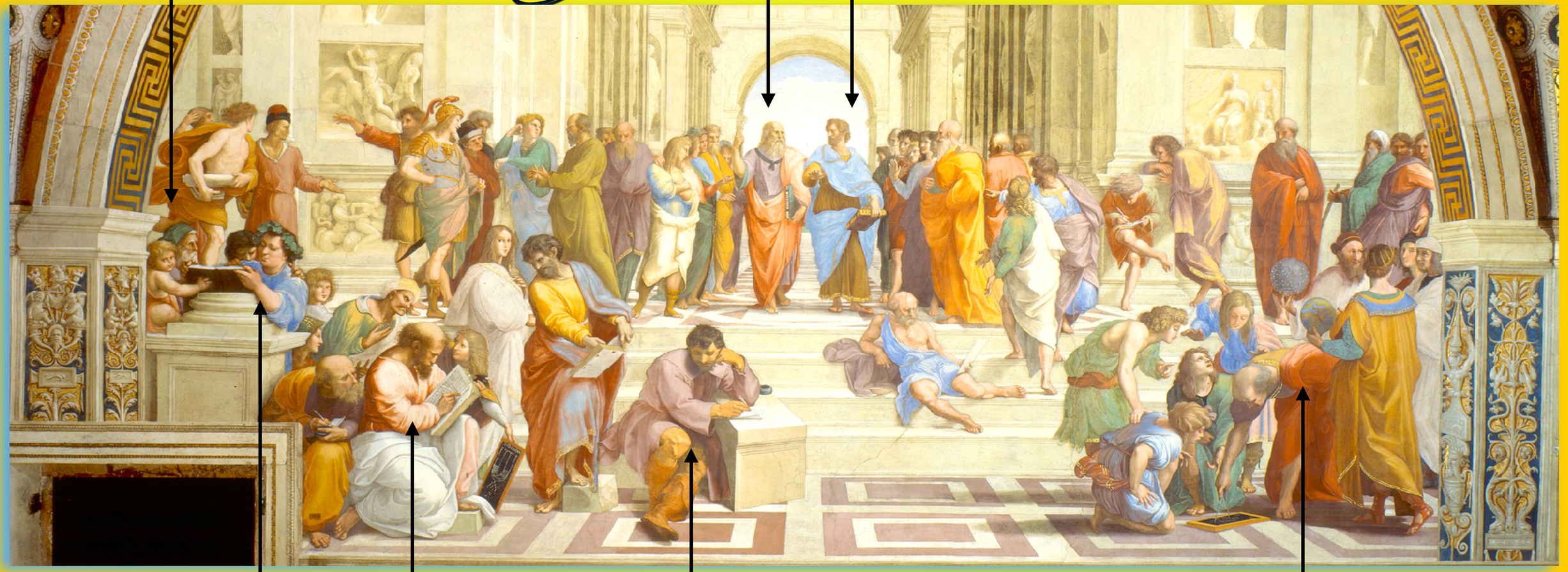
Pythagoras of Samos

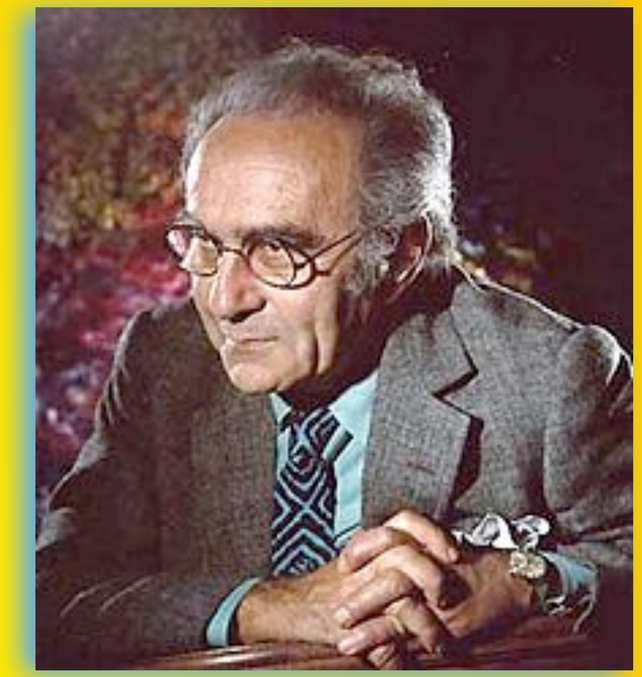
570–495 BC

500 BC
Pythagoreans

From the movie: Eternals 2021

School of Athens





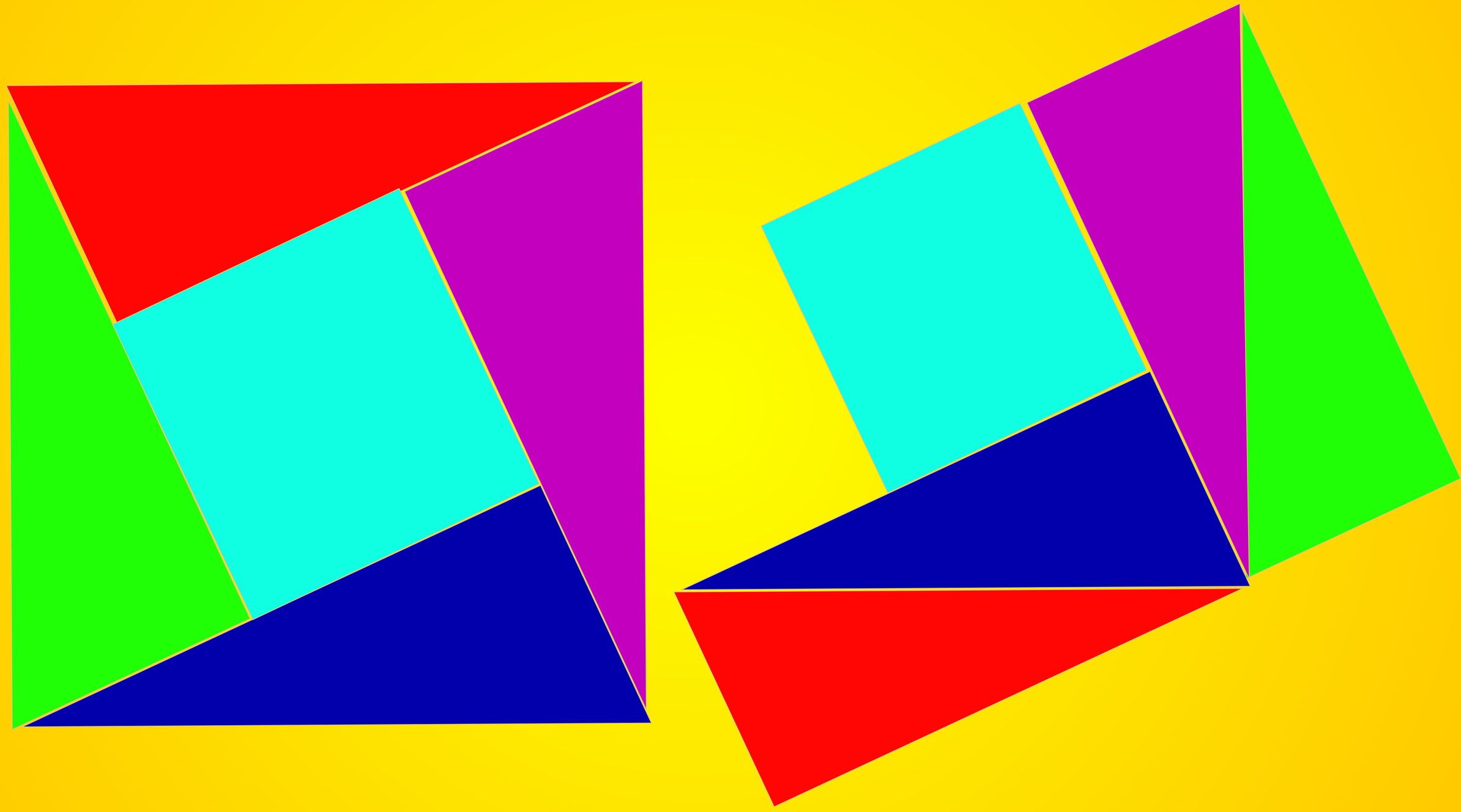
The Ascent of man

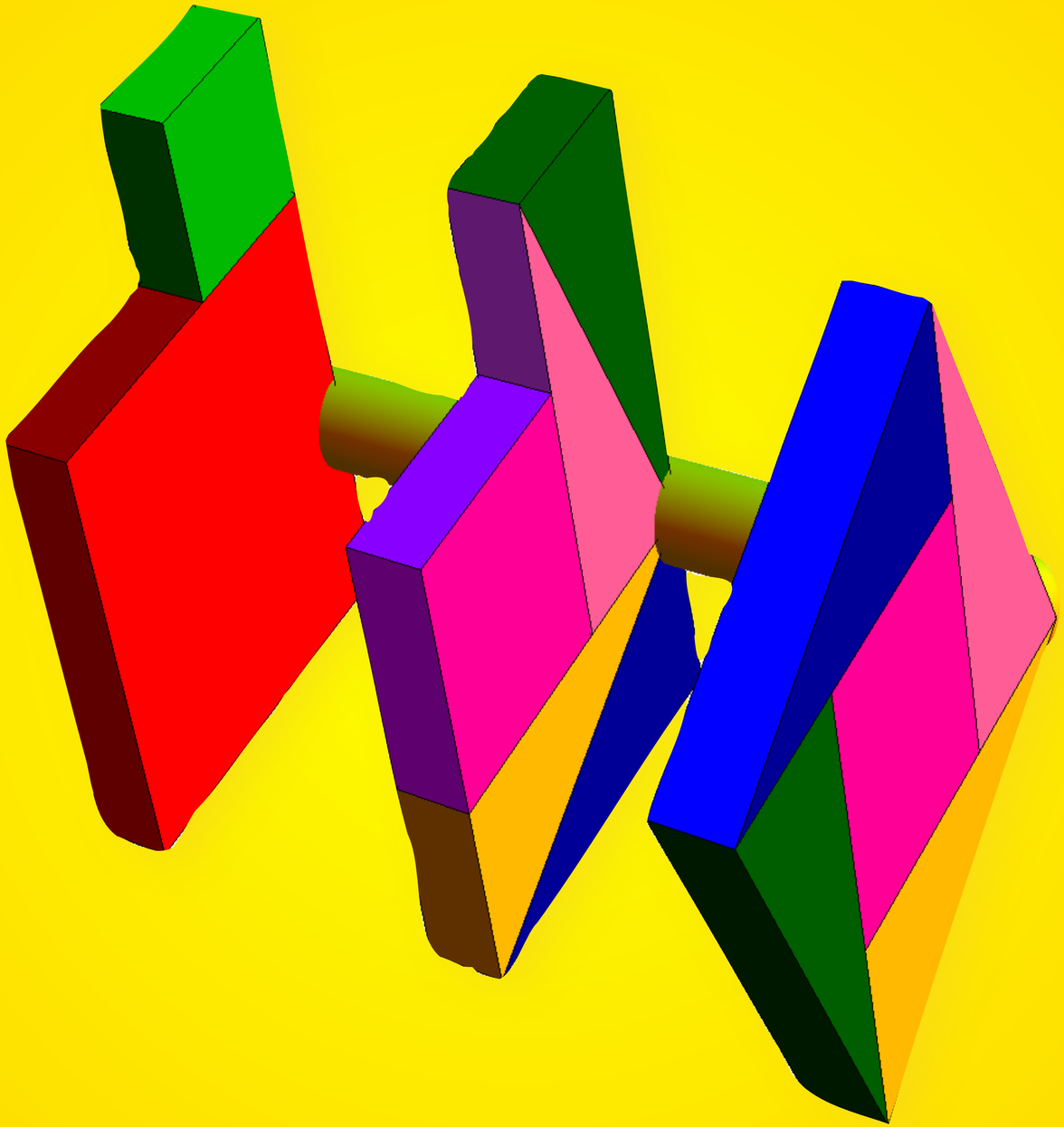
The Music of the Spheres,

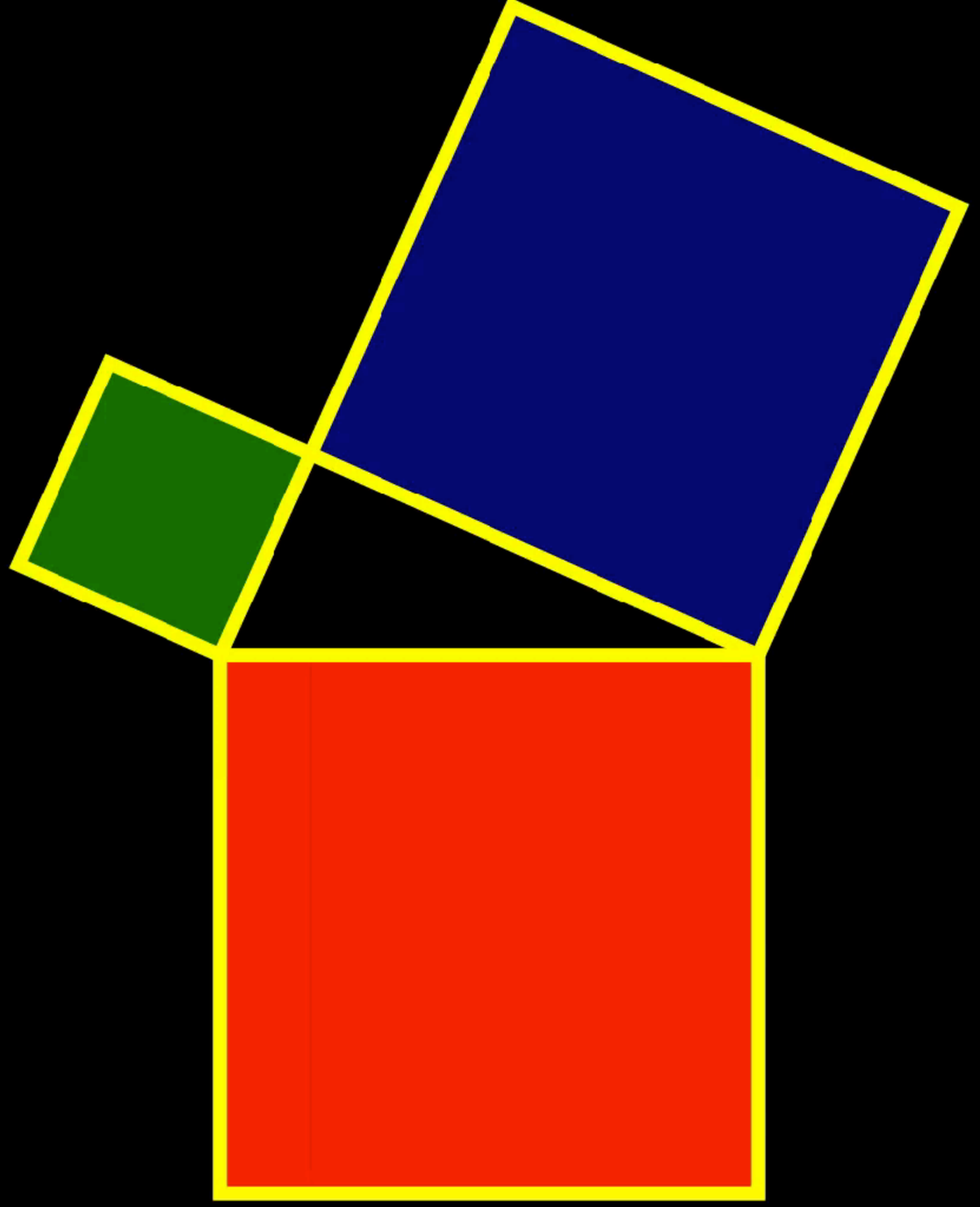
BBC 1973

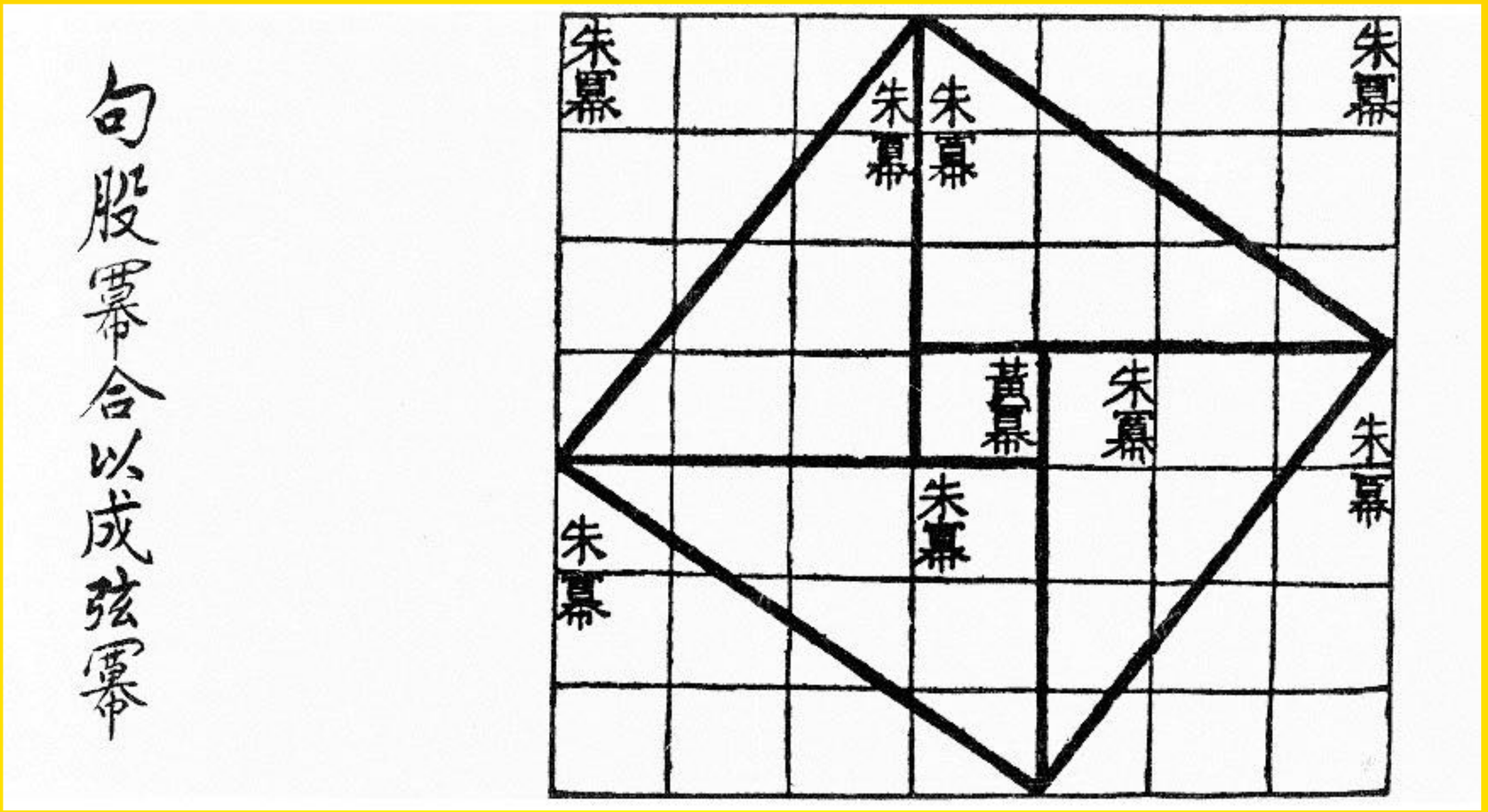
Jacob Bronowski

1908-1974









Zhou Bi Suan Jing,

1046 BC - 771 BC continued until 200 BC

mathematical text

one of the first recorded proofs

Component

$$\text{comp}_{\vec{w}}(\vec{v}) = \frac{\vec{v} \cdot \vec{w}}{\|\vec{w}\|}$$

Homework due Monday

THE END