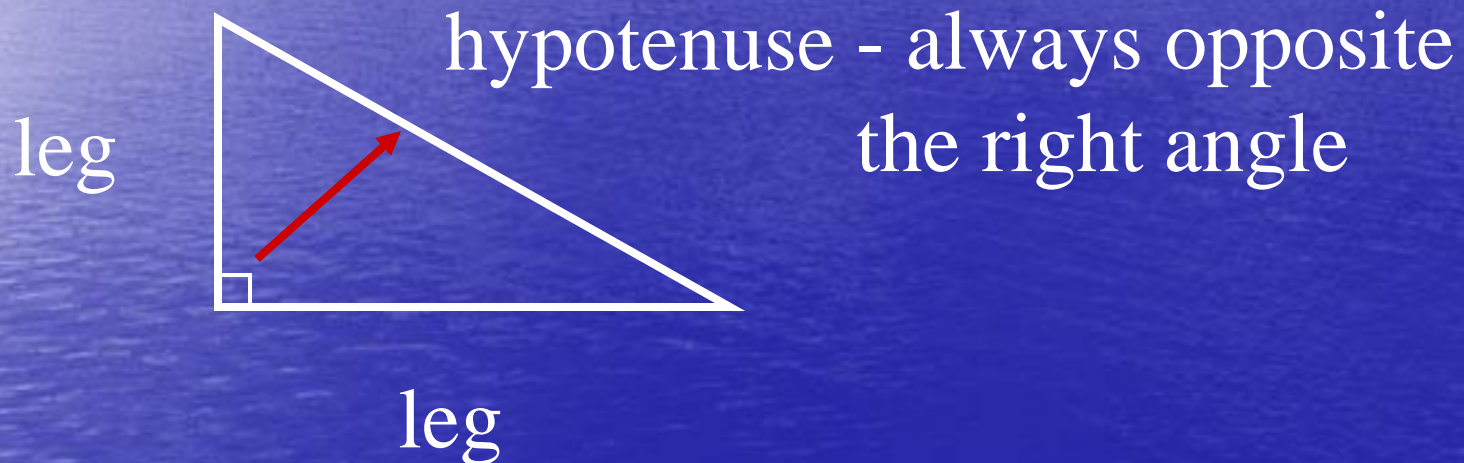


**To Prove
Pythagore's
Theorem**

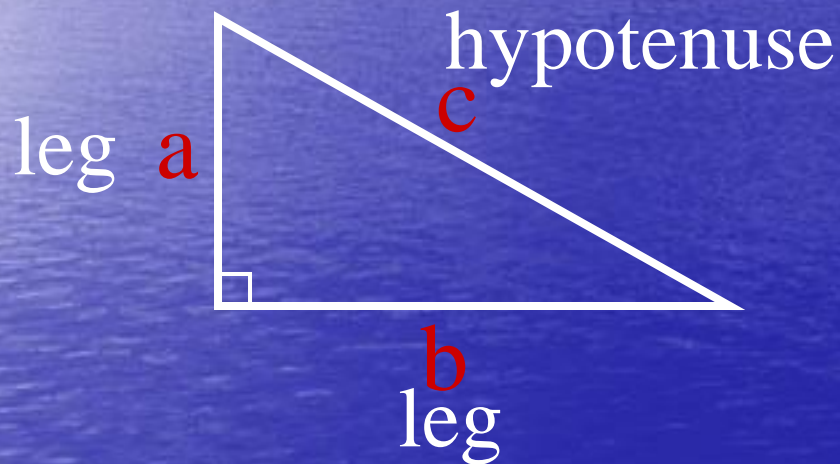
Objective - To solve problems involving the Pythagorean Theorem.

For Right Triangles Only!



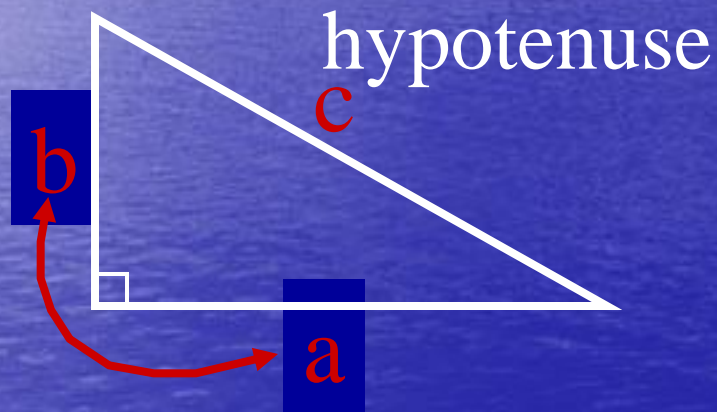
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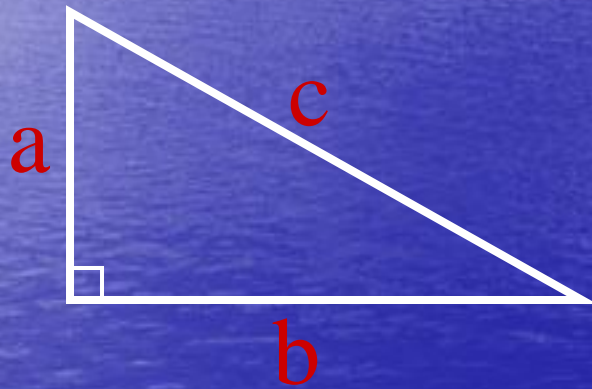


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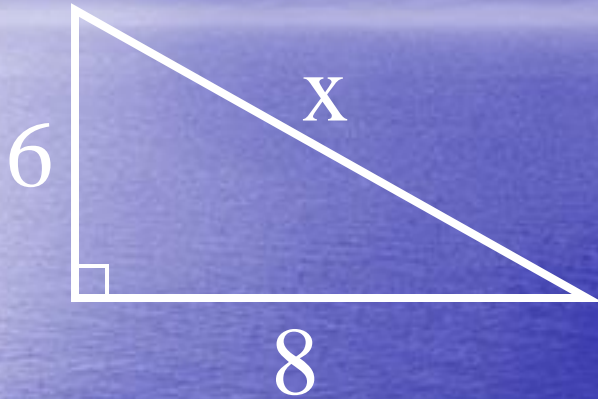
For Right Triangles Only!

Pythagorean Theorem

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



Solve for x.



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

$$6^2 + 8^2 = x^2$$

$$36 + 64 = x^2$$

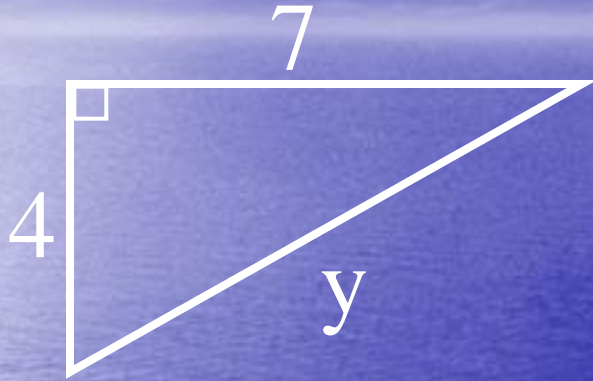
$$100 = x^2$$

$$\sqrt{100} = \sqrt{x^2}$$

$$10 = |x|$$

$$x = 10 \text{ or } -10$$

Solve for y.



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

$$7^2 + 4^2 = y^2$$

$$49 + 16 = y^2$$

$$65 = y^2$$

$$\sqrt{65} = \sqrt{y^2}$$

$$\sqrt{65} = |y|$$

$$y = \sqrt{65} \text{ or } -\sqrt{65}$$

$$y \approx 8.1$$

Solve for t.



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

$$t^2 + 6^2 = 15^2$$

$$t^2 + 36 = 225$$

$$\begin{array}{r} -36 \\ \hline \end{array}$$

$$t^2 = 189$$

$$\sqrt{t^2} = \sqrt{189}$$

$$t = \sqrt{189}$$

$$t \approx 13.7$$

Pythagorean Triples

3 4 5

6 8 10

9 12 15

12 16 20

•
•
•

PYTHAGOREAN TRIPLES

3 4 5

6 8 10

9 12 15

12 16 20

⋮

5 12 13

10 24 26

15 36 39

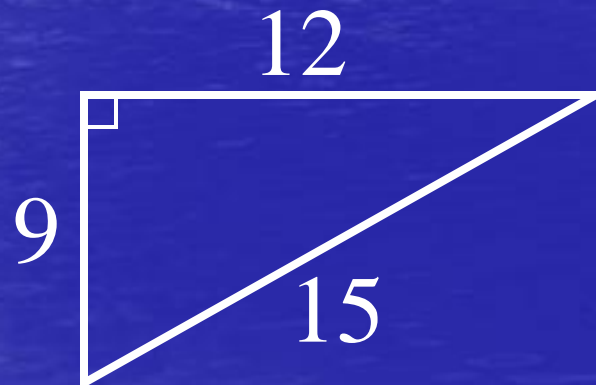
⋮

7 24 25

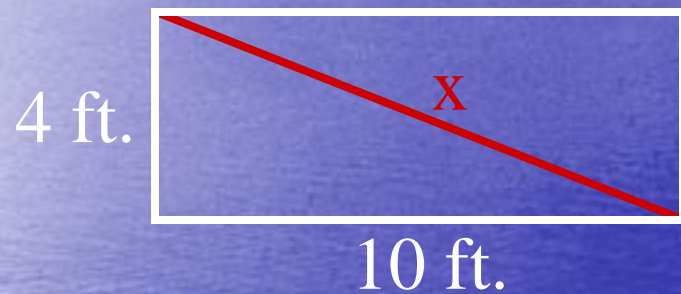
14 48 50

21 72 75

⋮



To the nearest tenth of a foot, find the length of the diagonal of a rectangle with a width of 4 feet and a length of 10 feet.



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

$$4^2 + 10^2 = x^2$$

$$16 + 100 = x^2$$

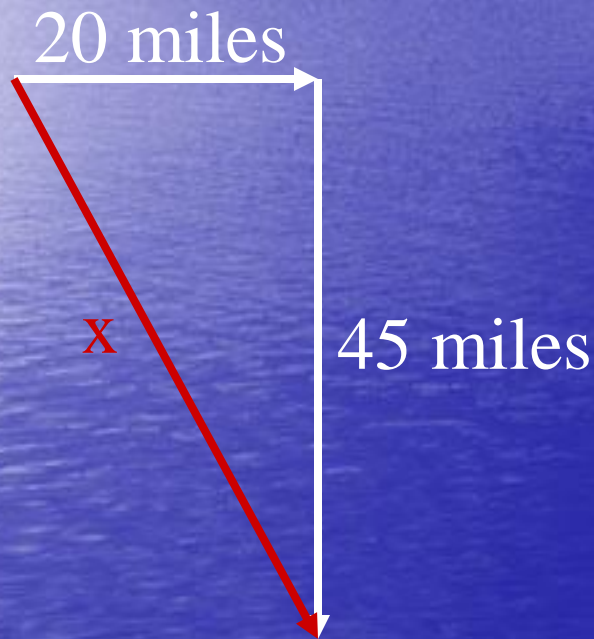
$$116 = x^2$$

$$\sqrt{116} = \sqrt{x^2}$$

$$x = \sqrt{116}$$

$$x \approx 10.8$$

A car drives 20 miles due east and then 45 miles due south. To the nearest hundredth of a mile, how far is the car from its starting point?



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

$$20^2 + 45^2 = x^2$$

$$400 + 2025 = x^2$$

$$2425 = x^2$$

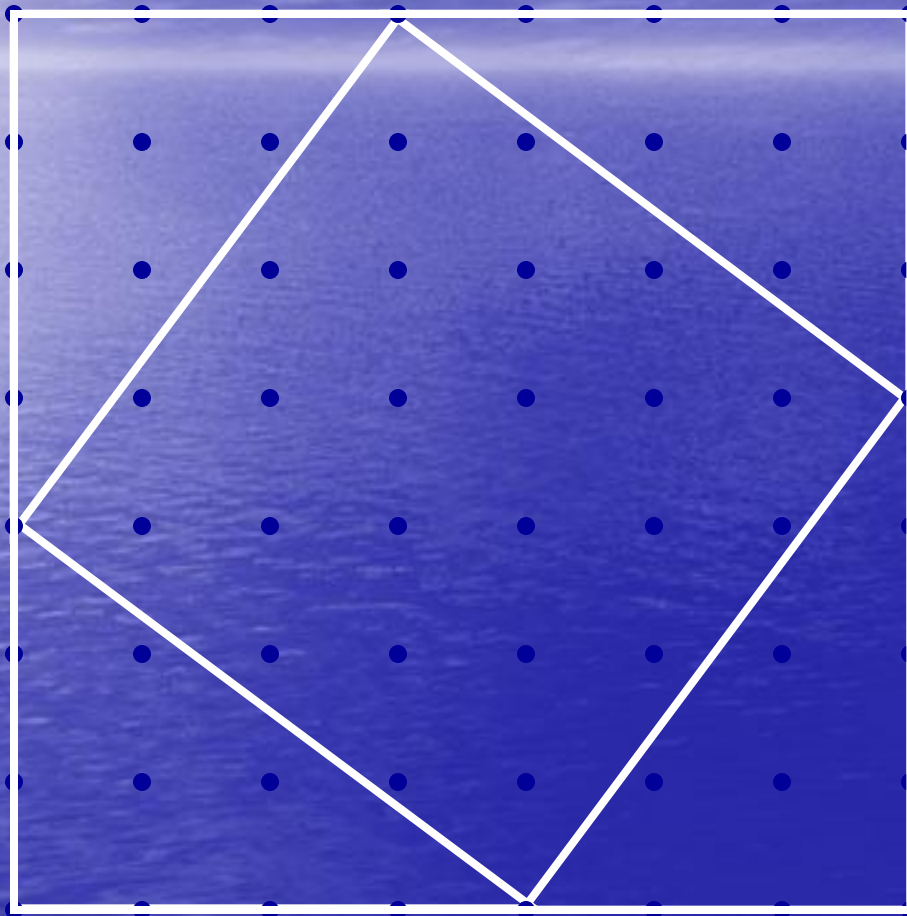
$$\sqrt{2425} = \sqrt{x^2}$$

$$x = \sqrt{2425}$$

$$x \approx 49.24$$

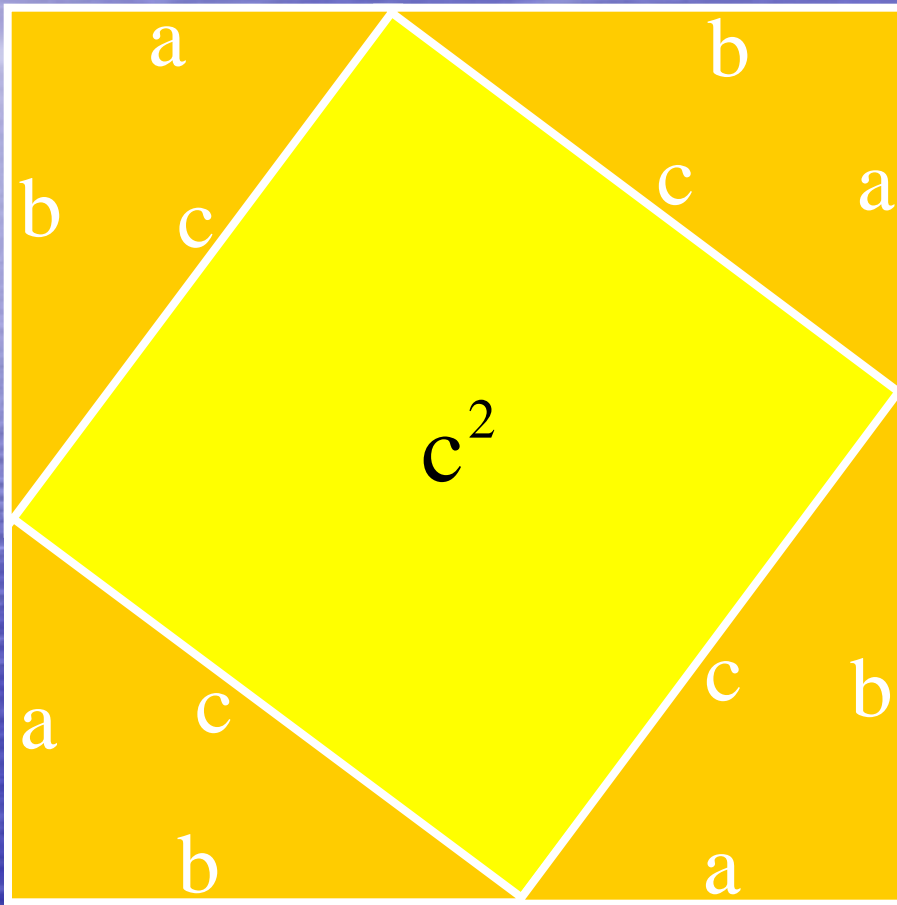
Informal Proof #1

Inscribe a square within the square.



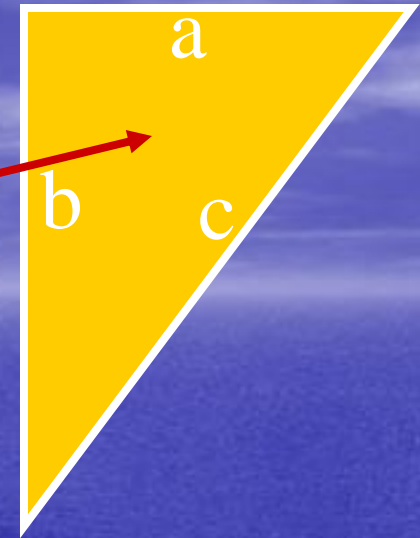
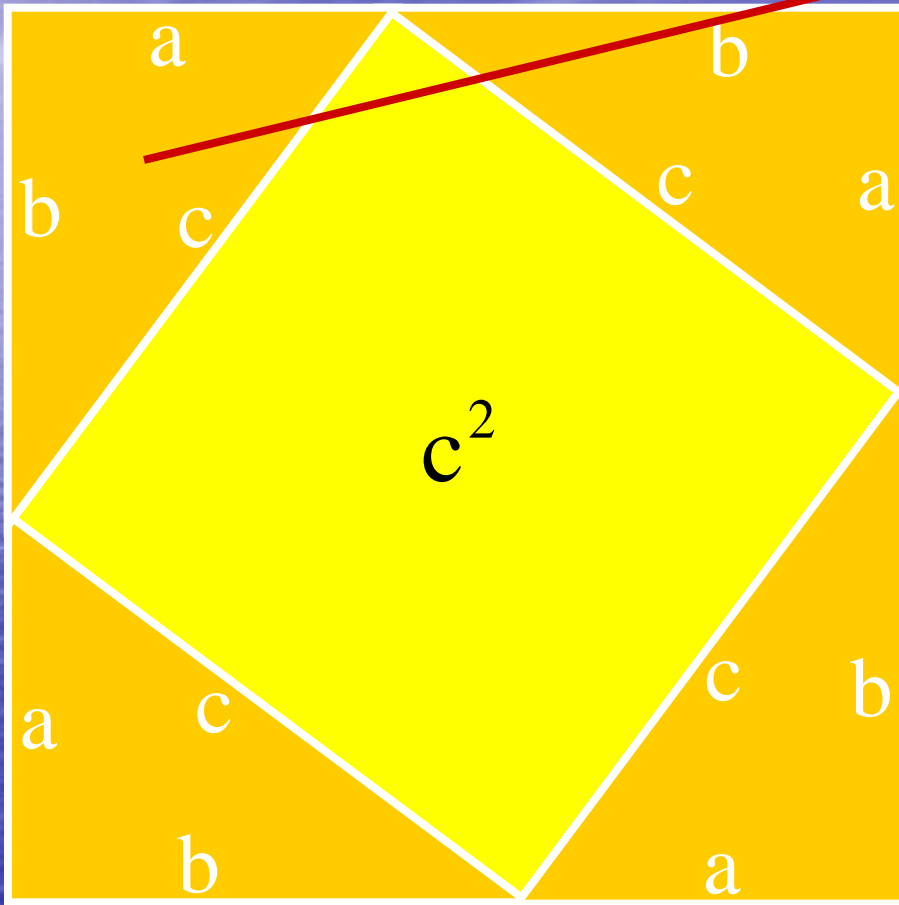
Informal Proof #1

Yellow region = c^2



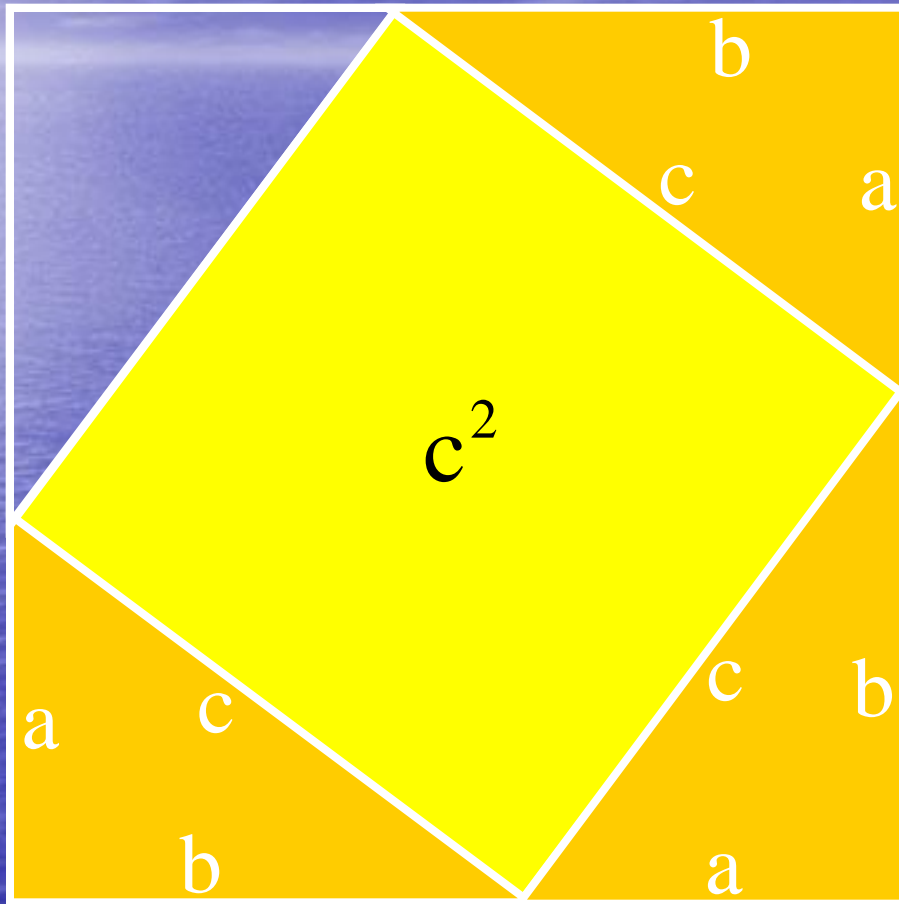
Informal Proof #1

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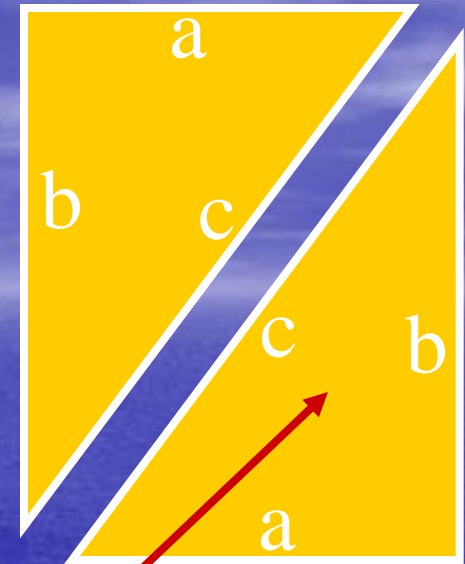
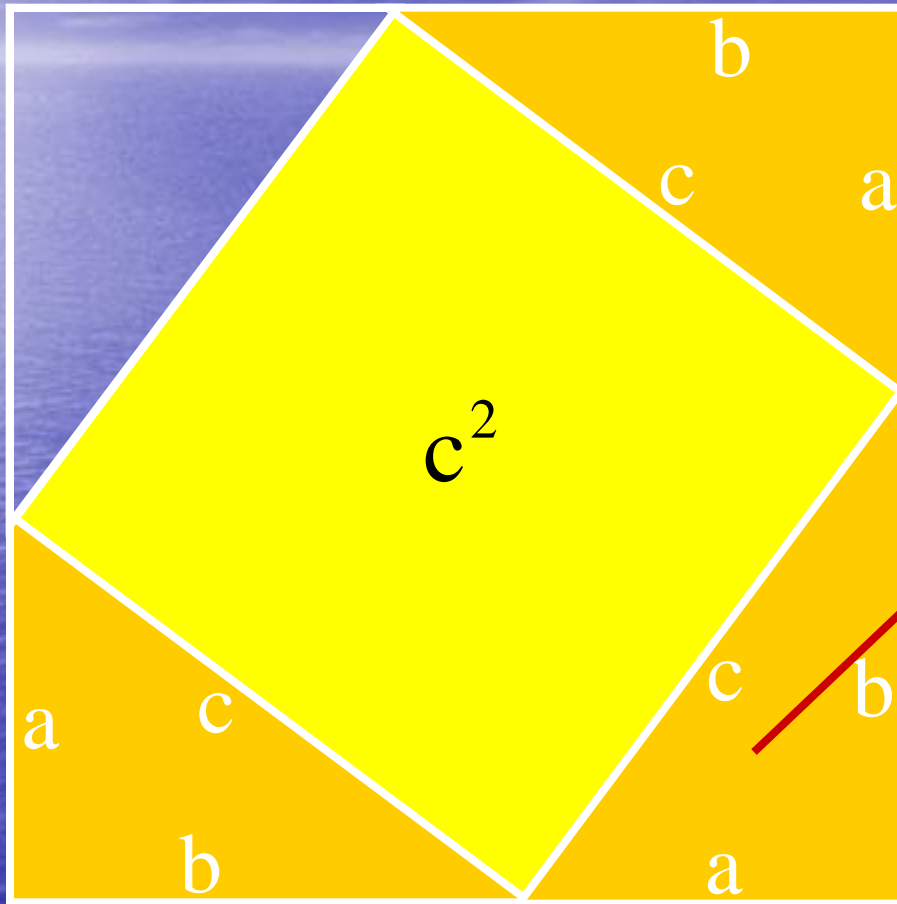
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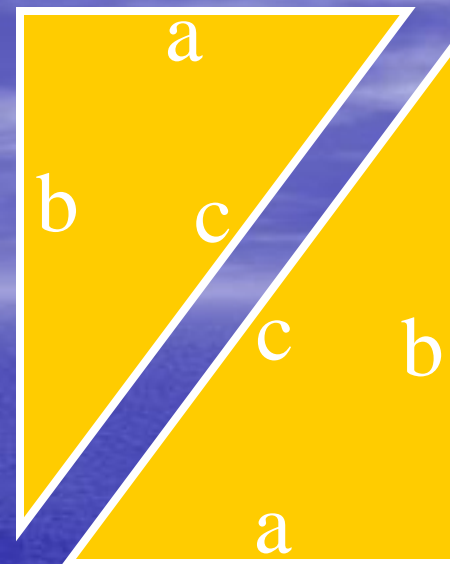
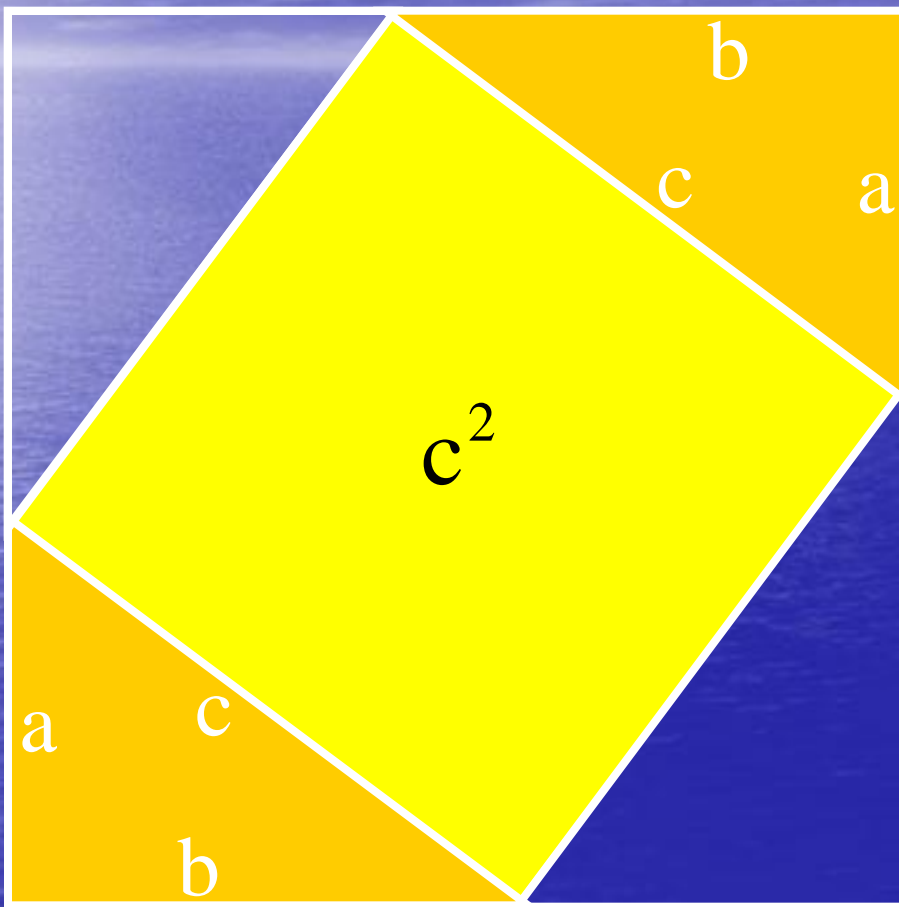
Informal Proof #1

Yellow region = c^2



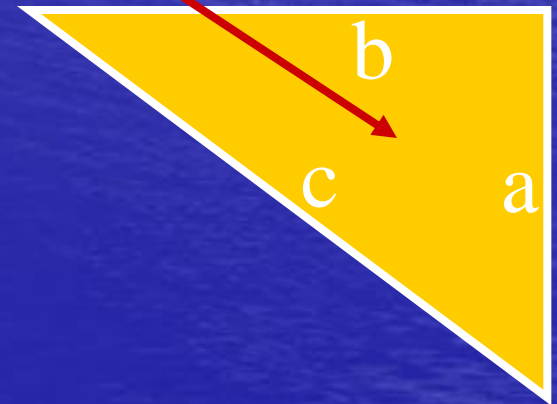
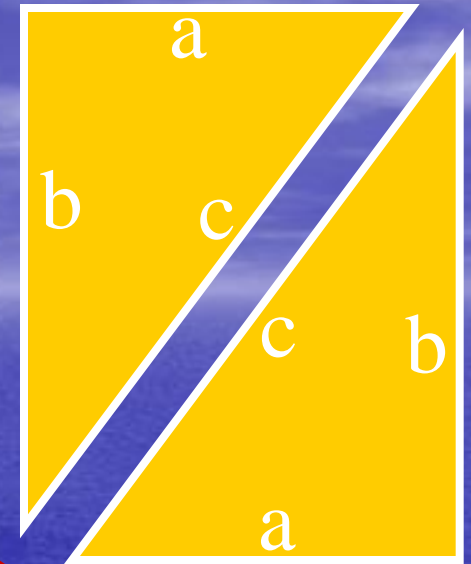
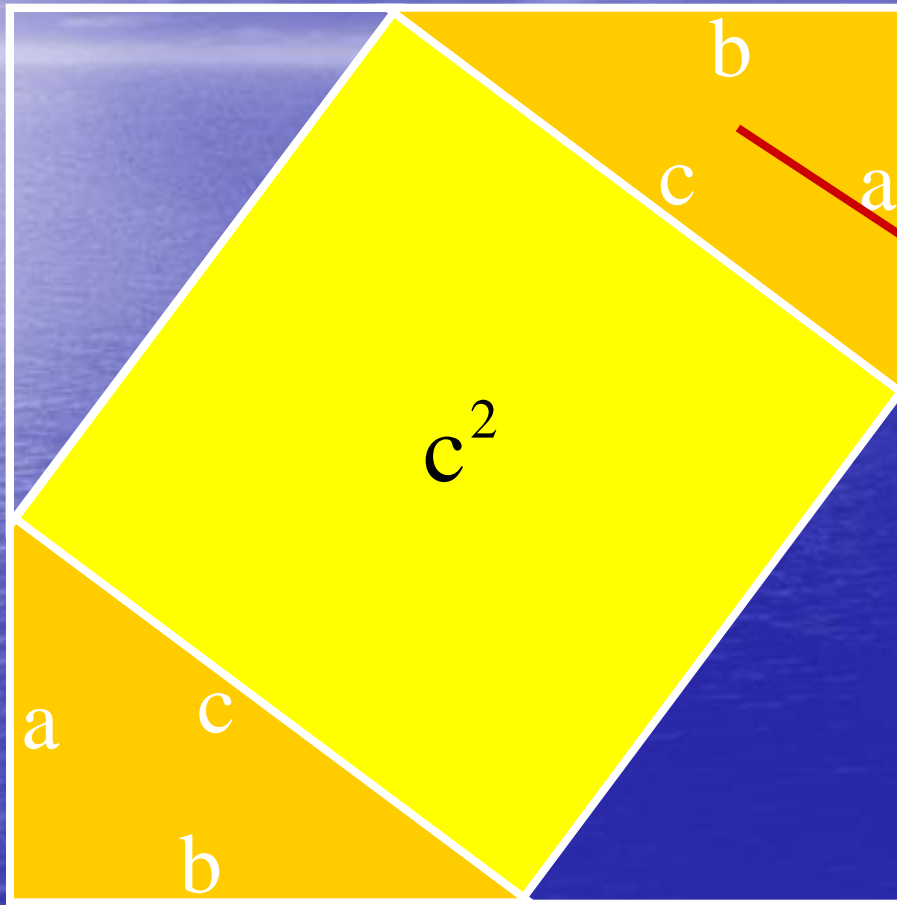
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Yellow region = c^2



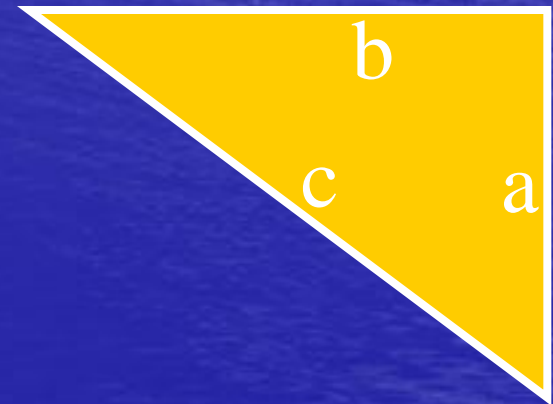
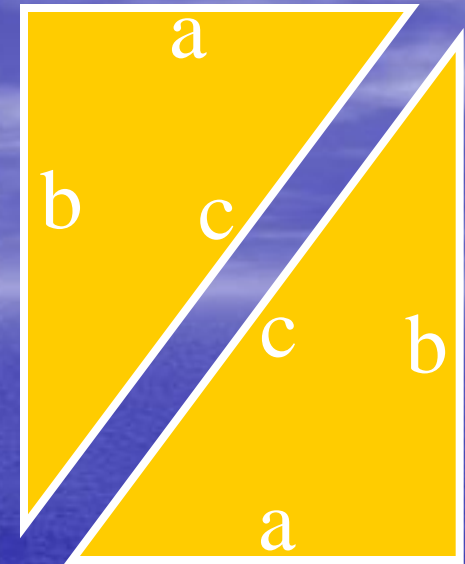
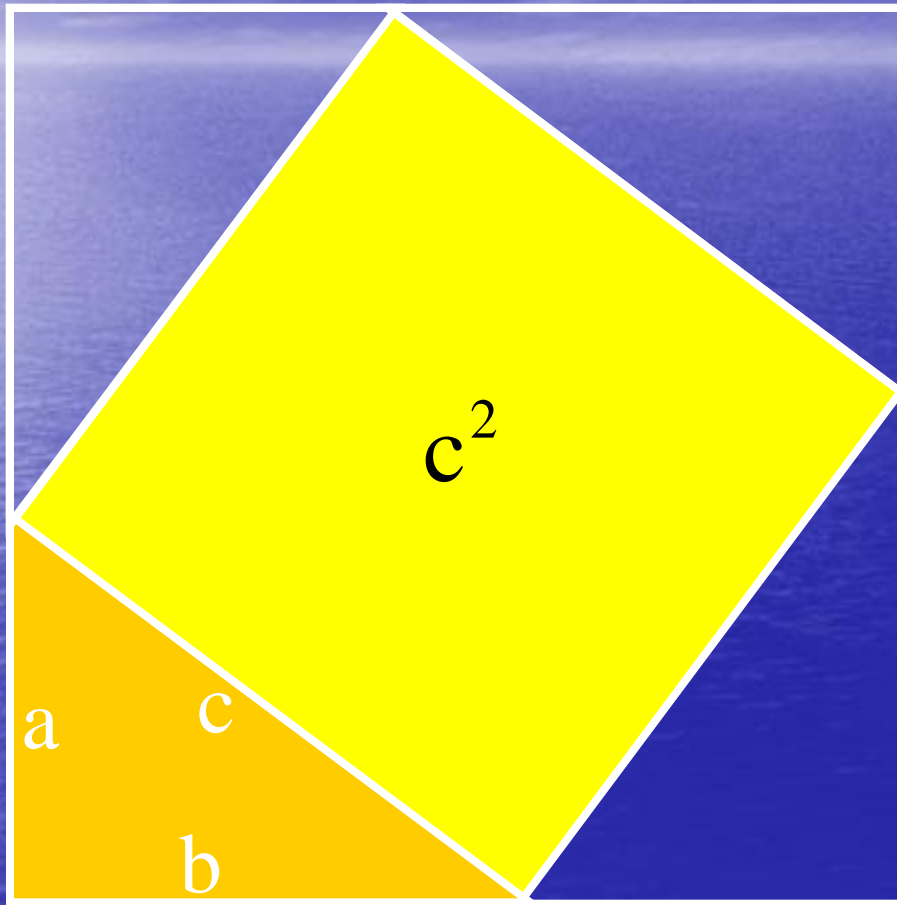
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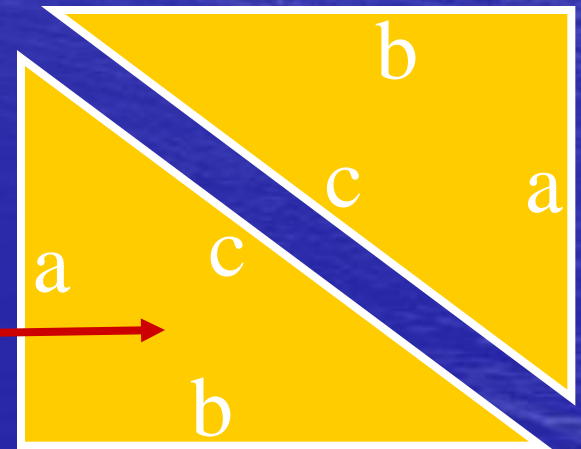
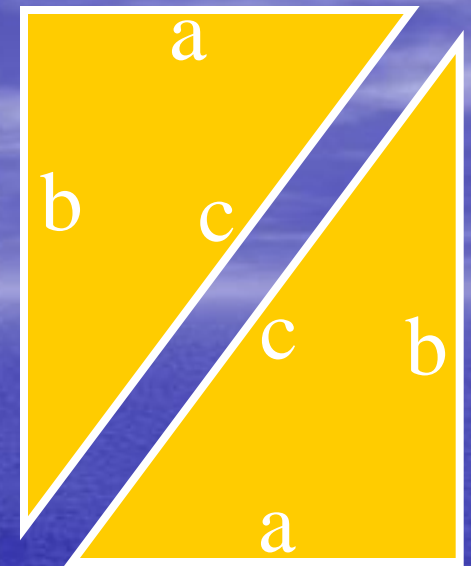
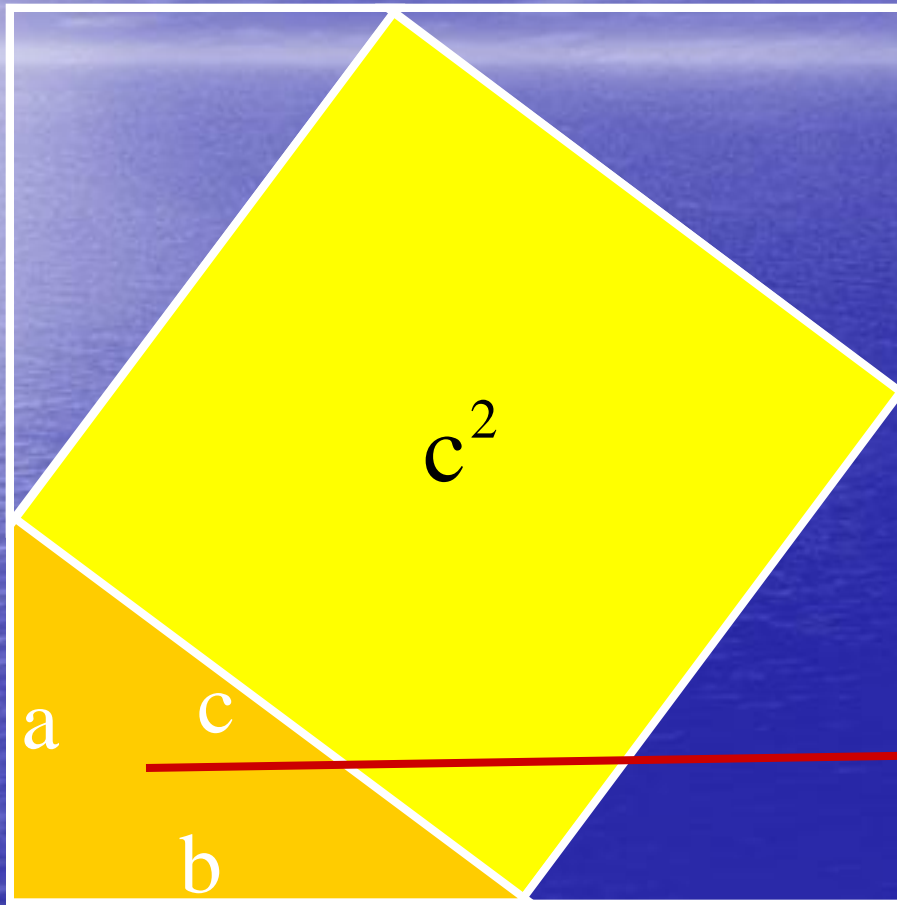
Informal Proof #1

Yellow region = c^2



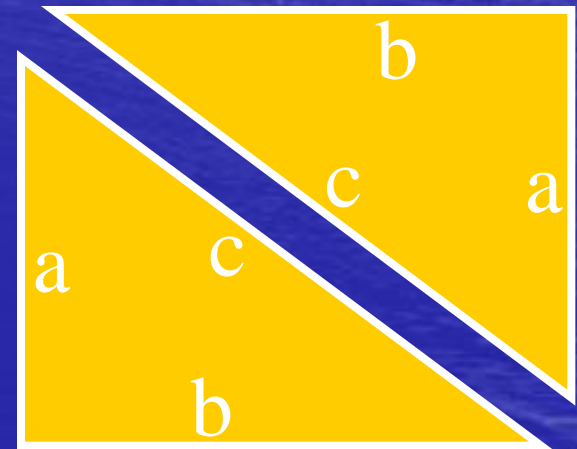
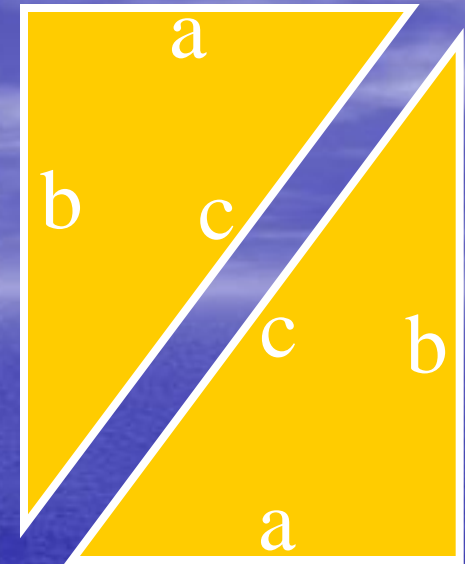
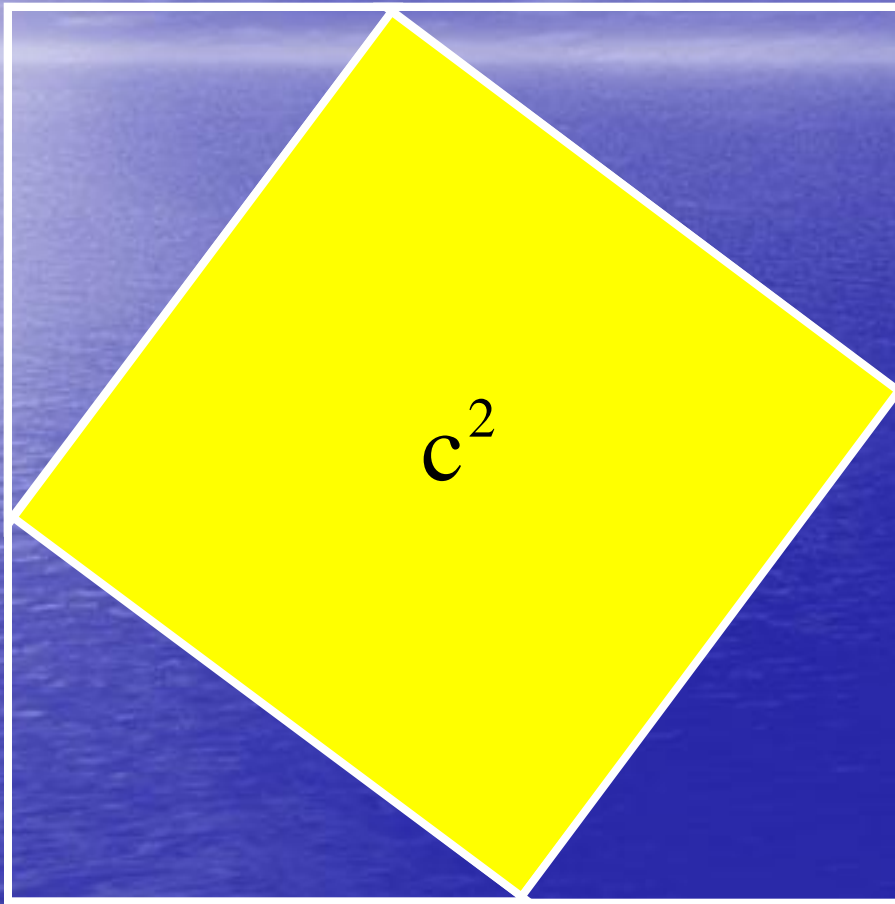
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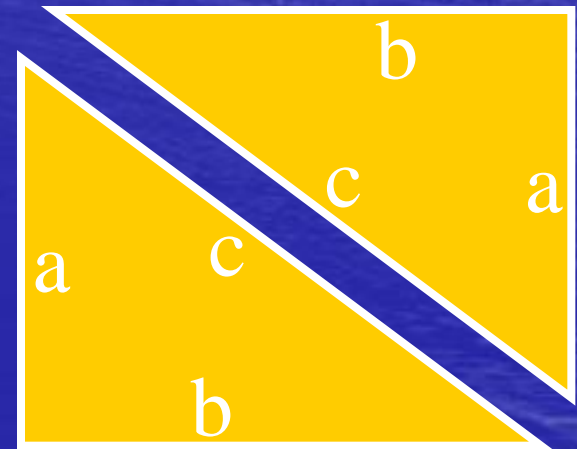
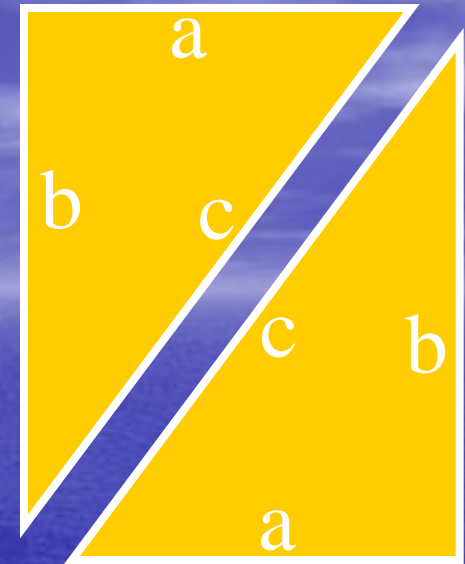
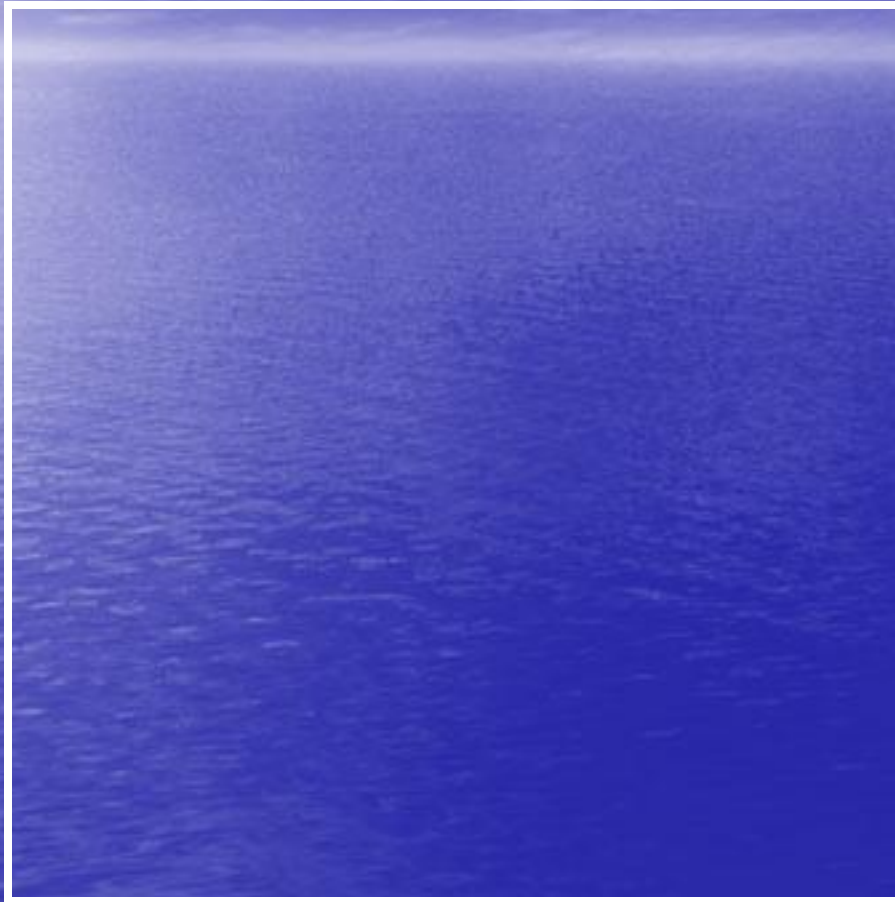
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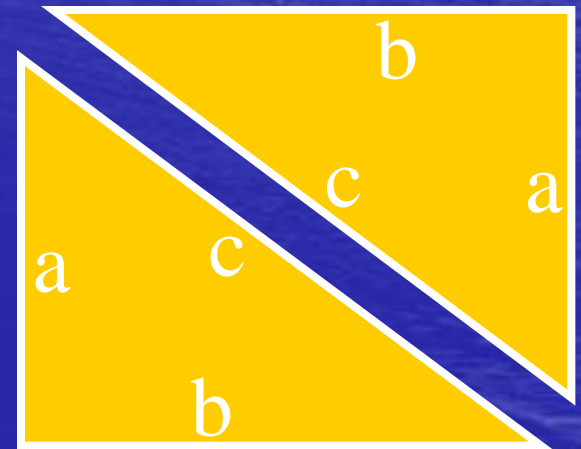
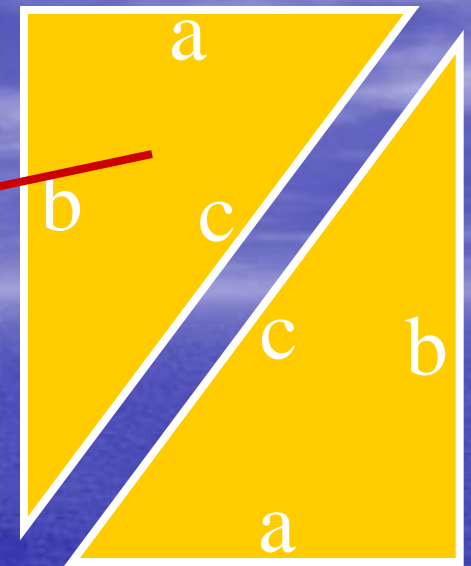
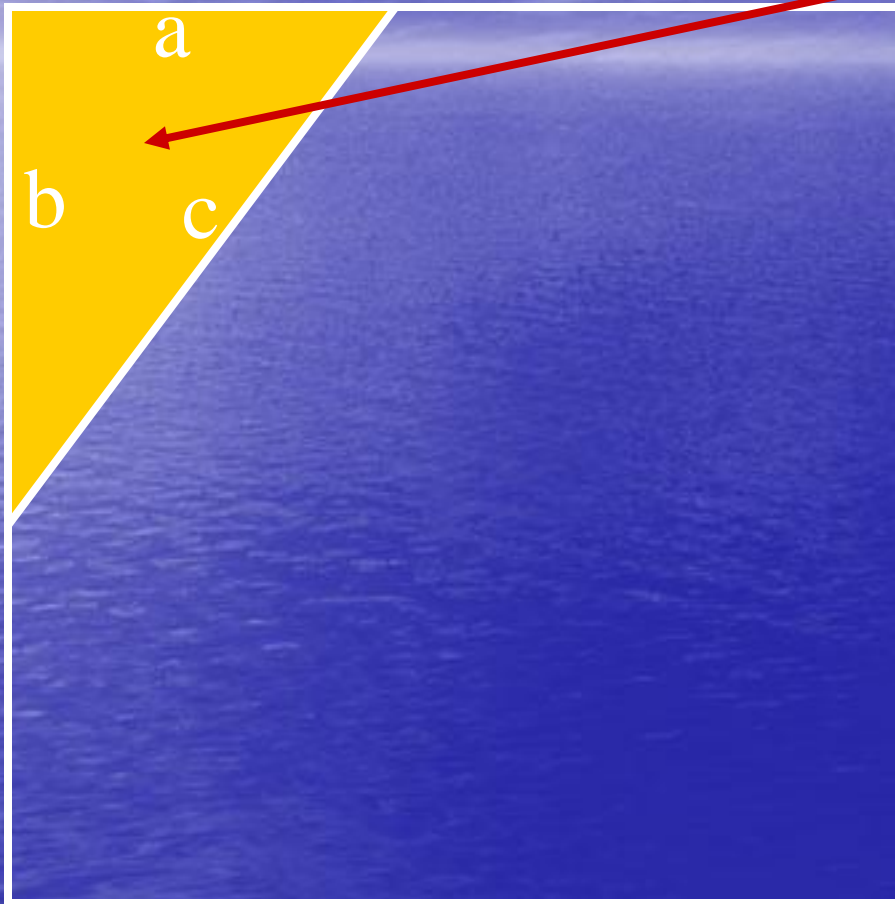
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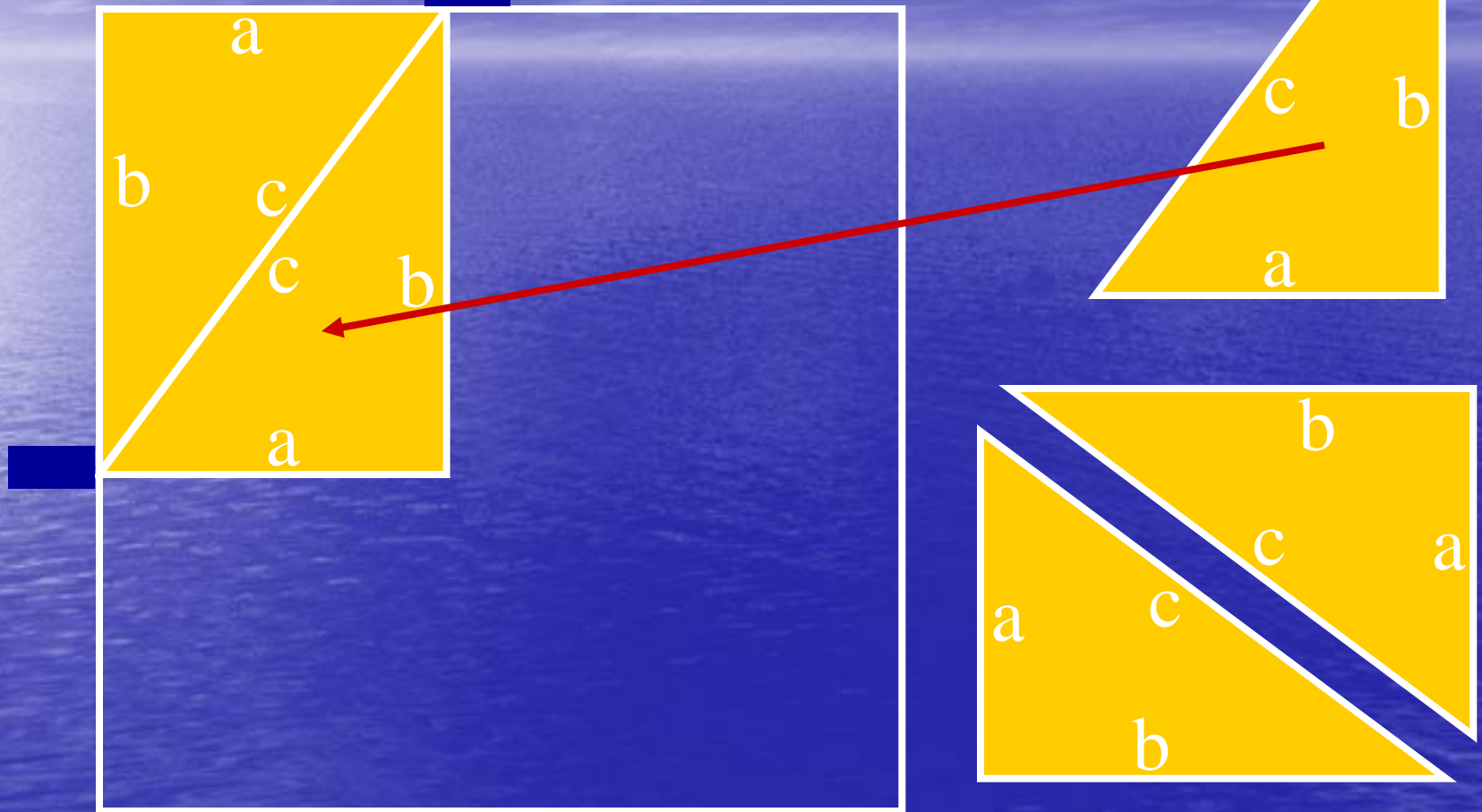
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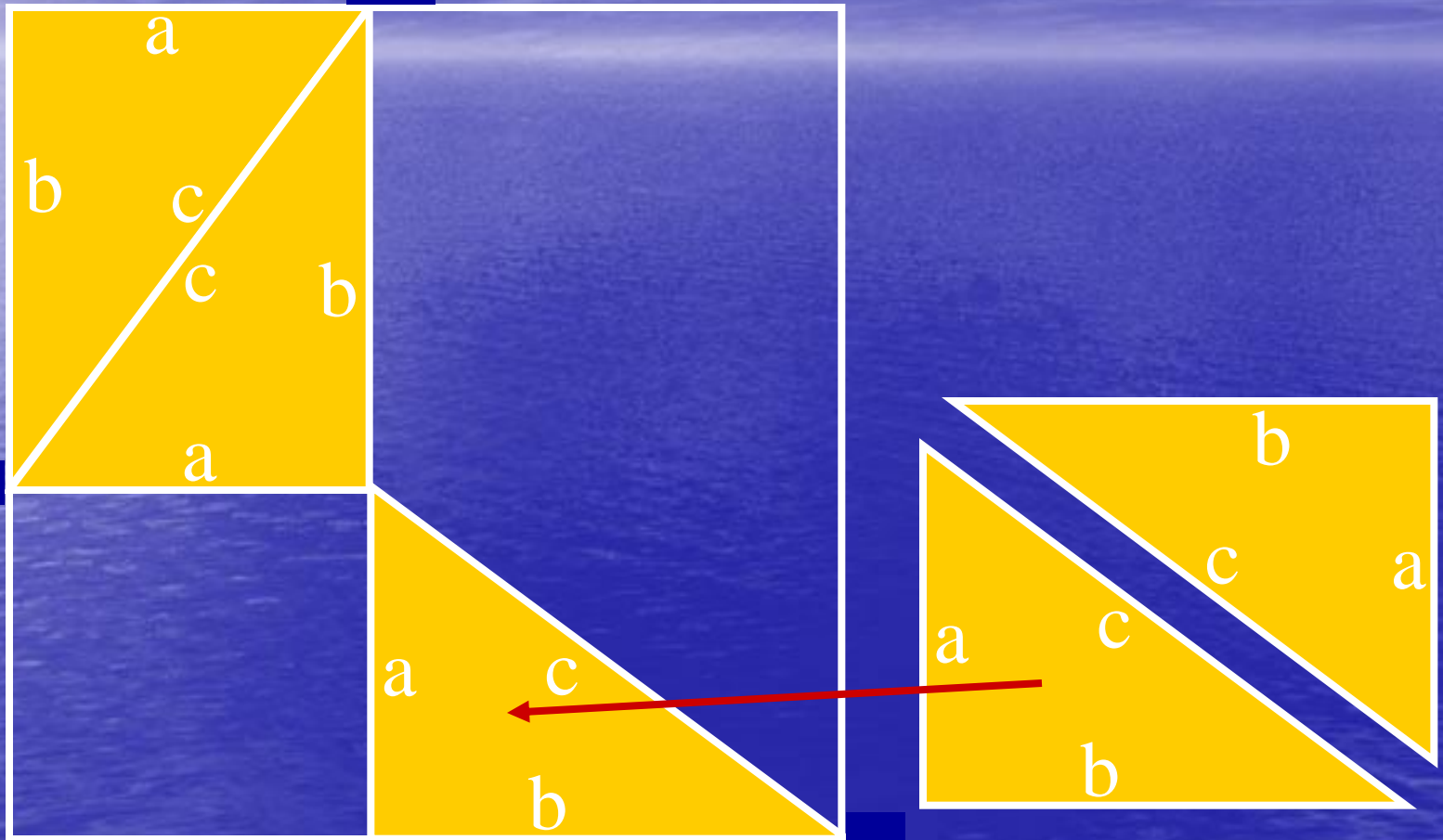
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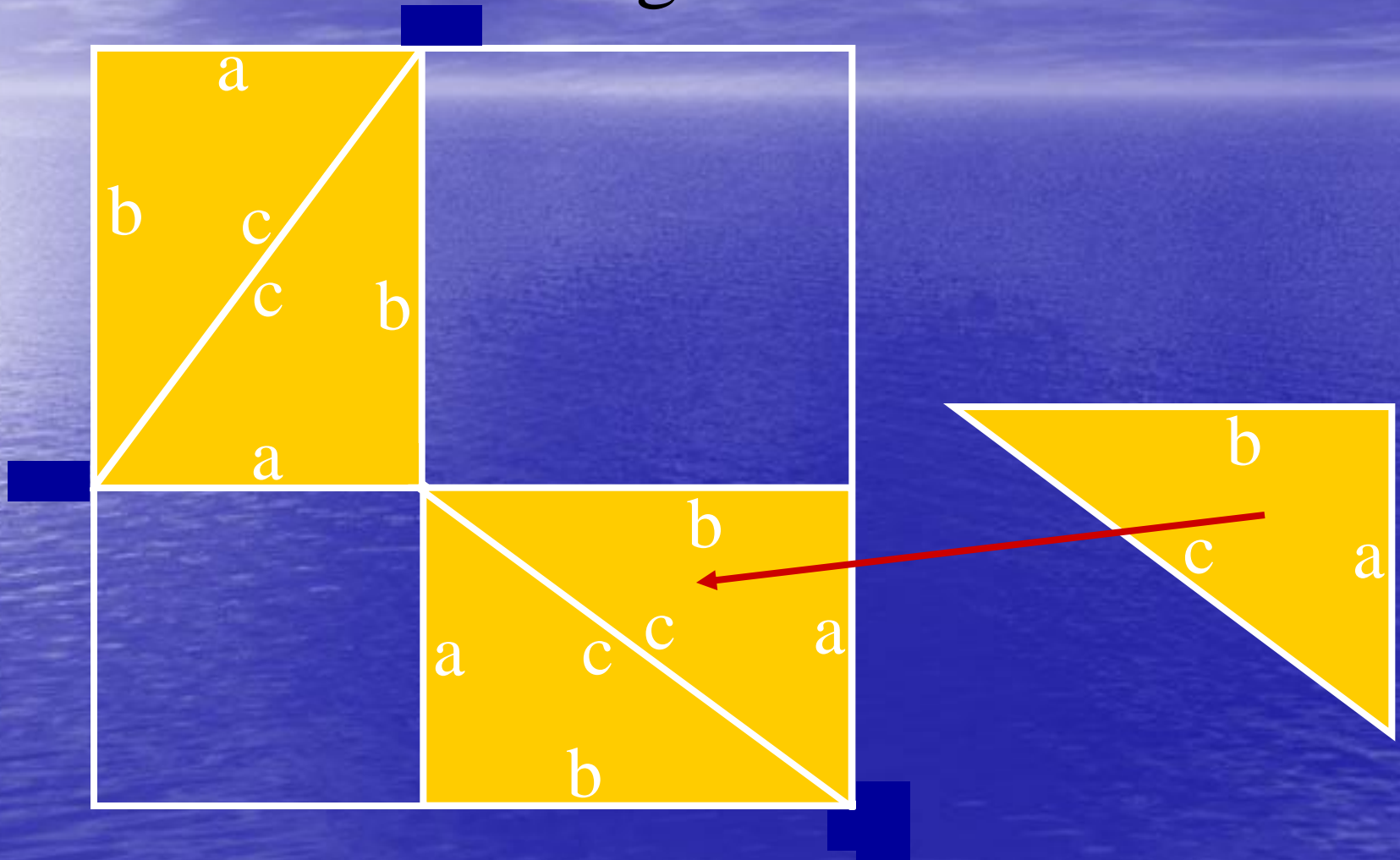
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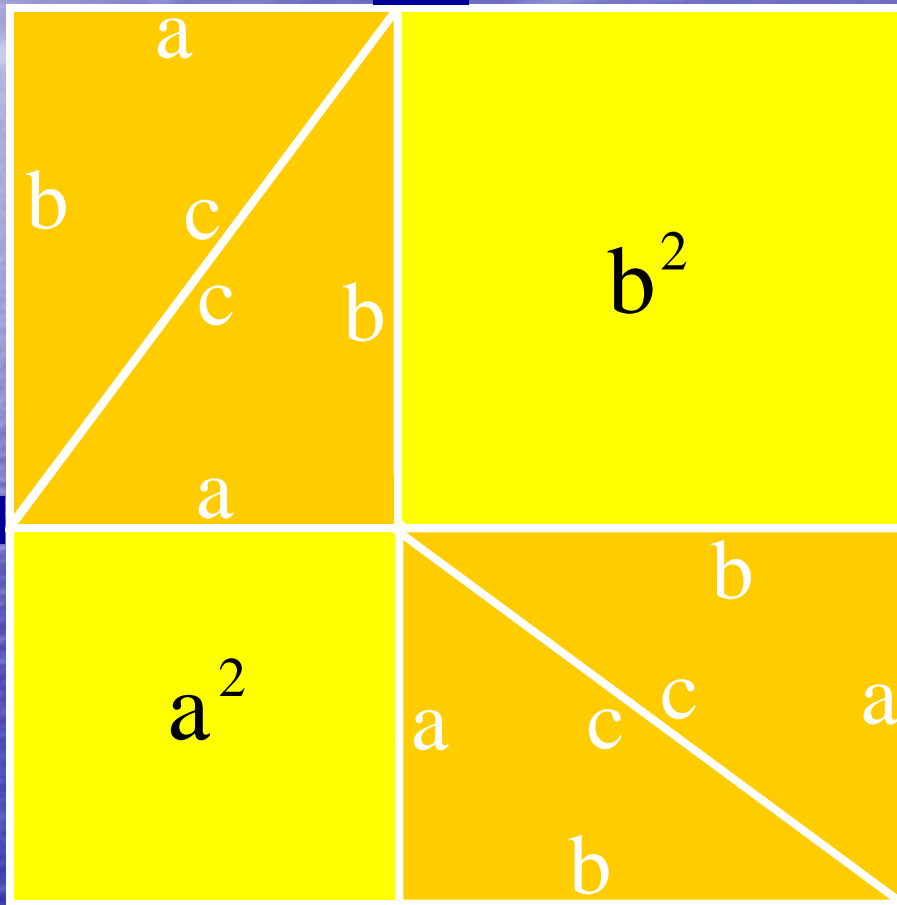
Informal Proof #1

Yellow region = c^2



Informal Proof #1

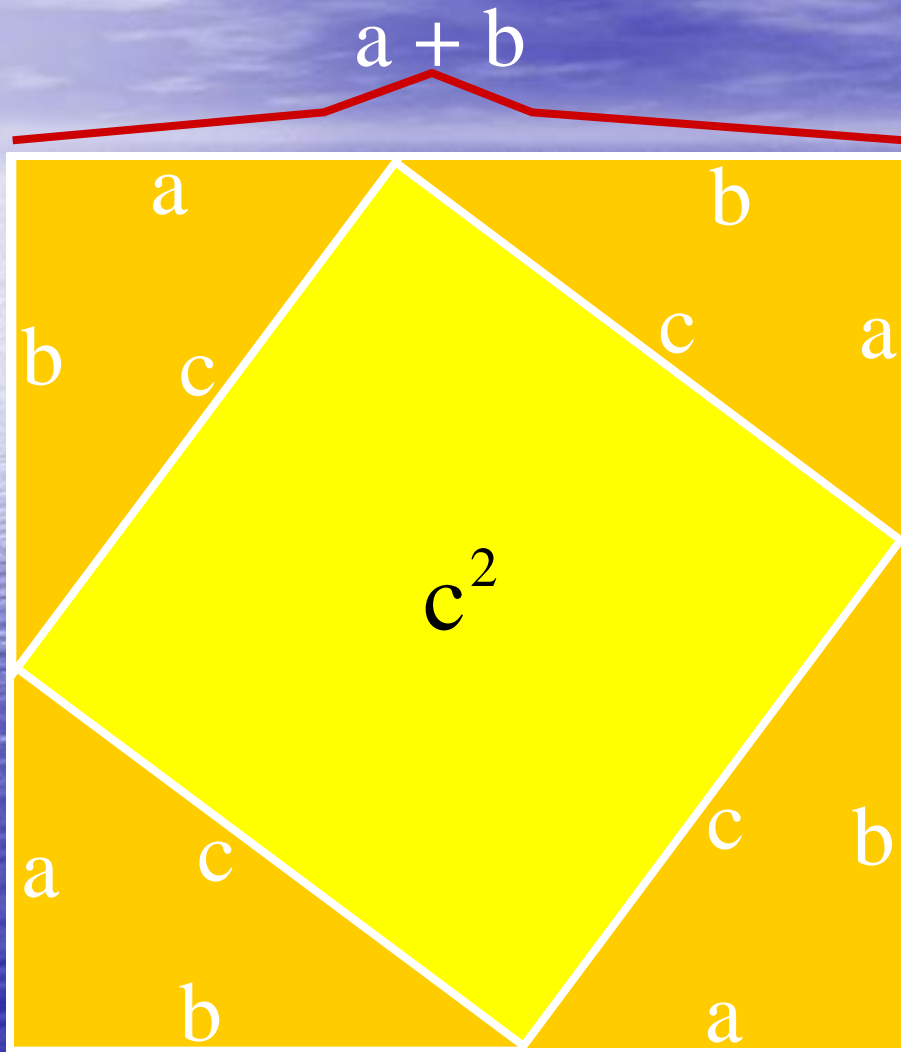
Yellow region = c^2



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

Yellow region = $a^2 + b^2$

Informal Proof #2



$$\text{Total Area} - \text{Purple Area} = \text{Yellow Area}$$

$$(a + b)^2 - 4 \left(\frac{1}{2} ab \right) = c^2$$

$$a^2 + \cancel{2ab} + b^2 - \cancel{2ab} = c^2$$

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