

# Designing questions for student-centered learning



AMISA 2024 Educators' Conference  
American School of Asuncion  
Asuncion, Paraguay, 21 March, 2024



# Designing questions for student-centered learning



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program

**1** context



program

**1** context

**2** classify



program

**1** context

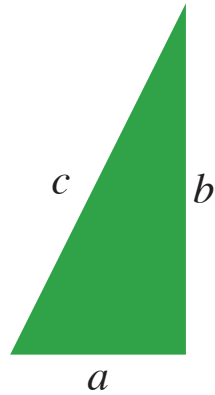
**2** classify

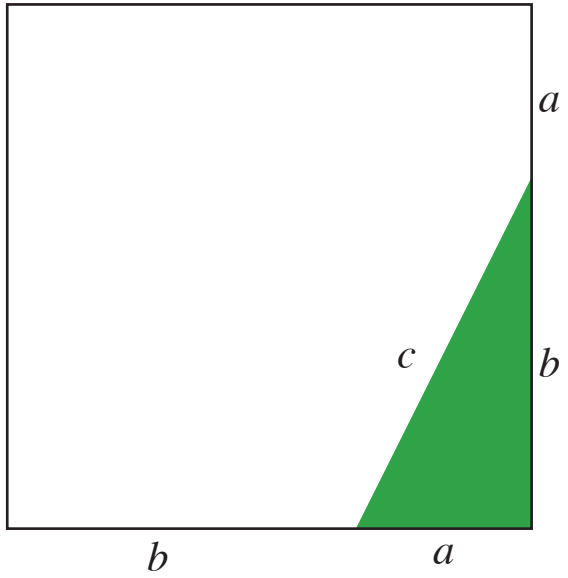
**3** improve

A group of students in a classroom or computer lab, with laptops open and text overlaid. The students are engaged in a discussion or collaborative work. The text "Pythagorean theorem" is overlaid in the center of the image.

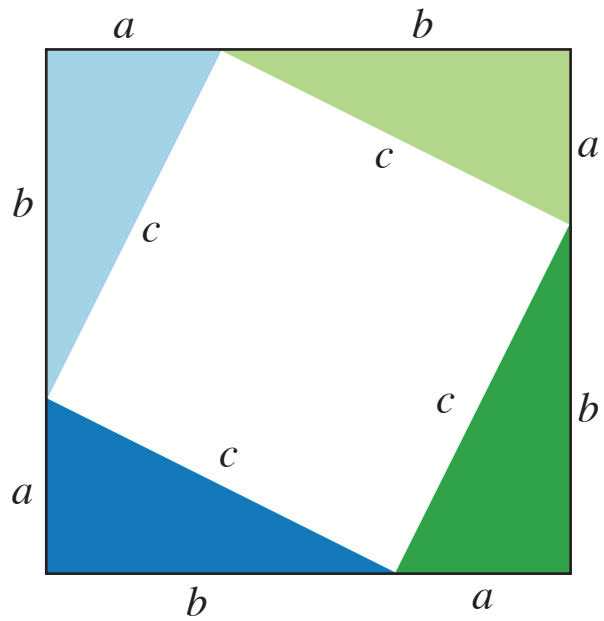
# Pythagorean theorem

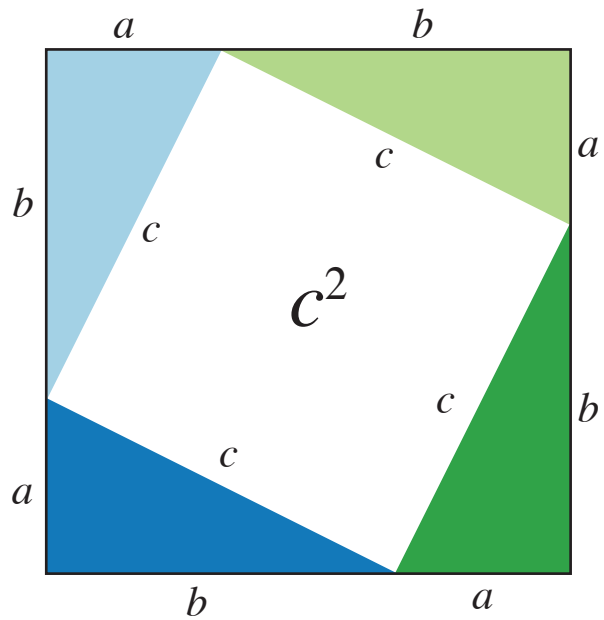
$$a^2 + b^2 = c^2$$

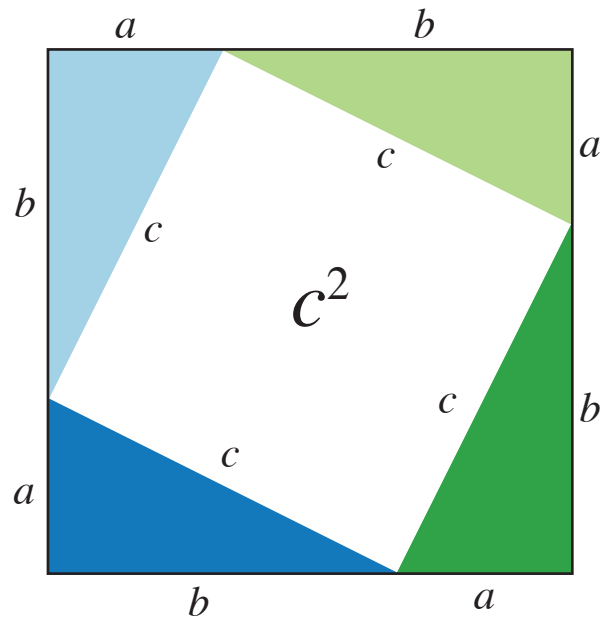
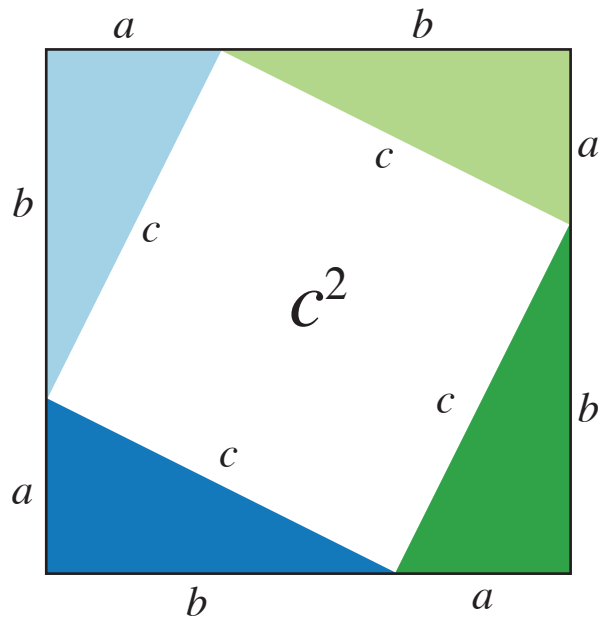


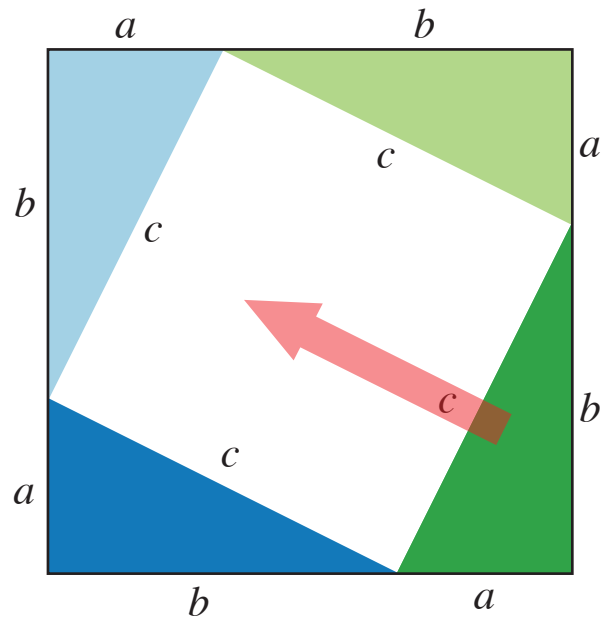
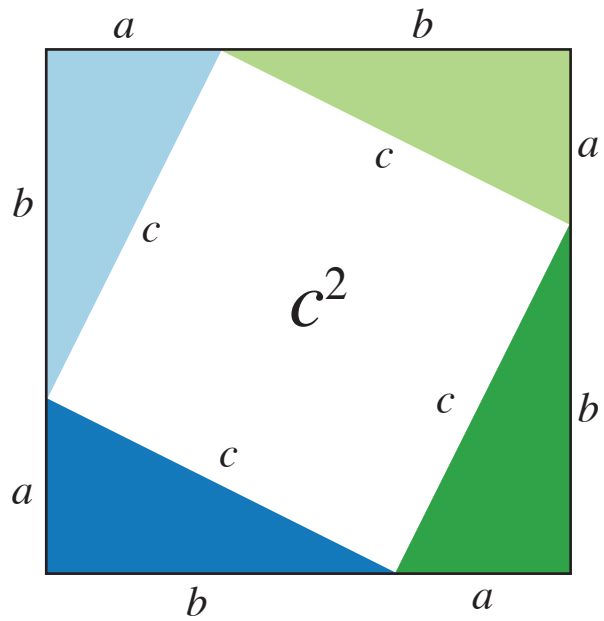


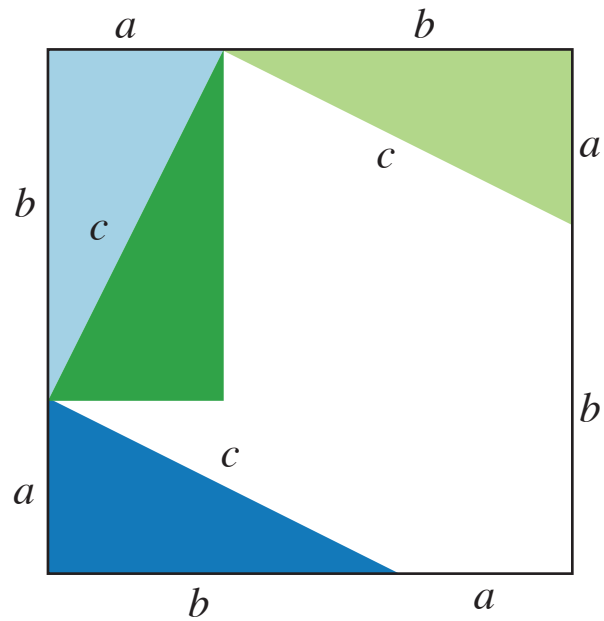
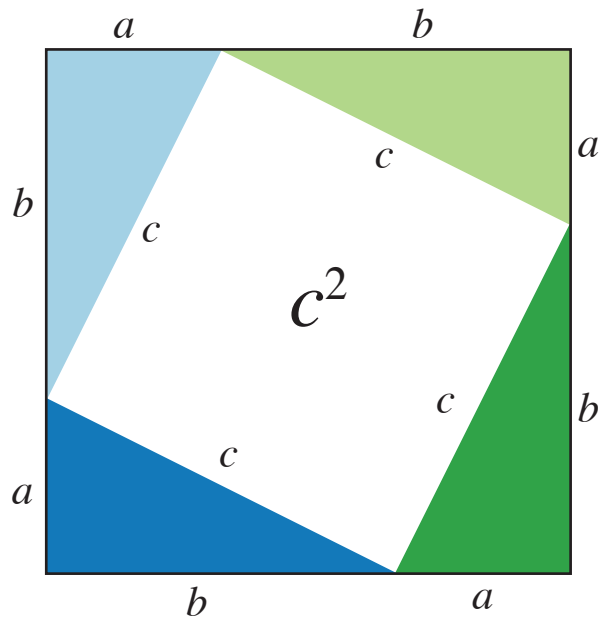


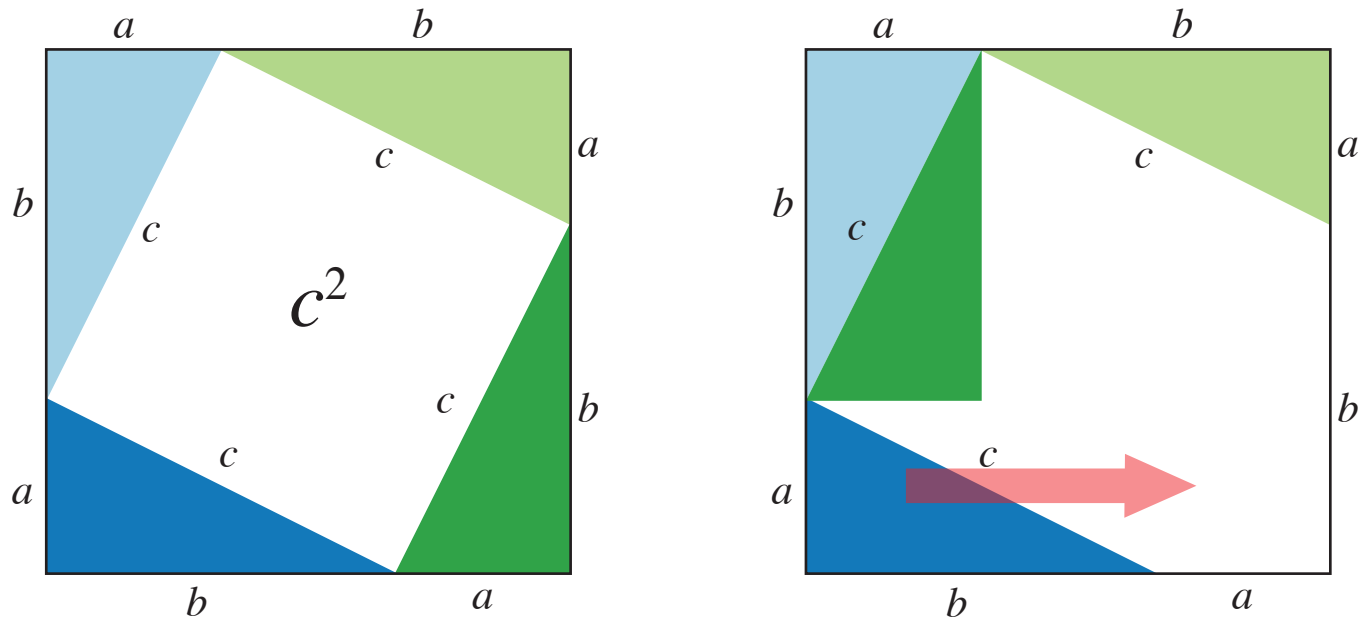


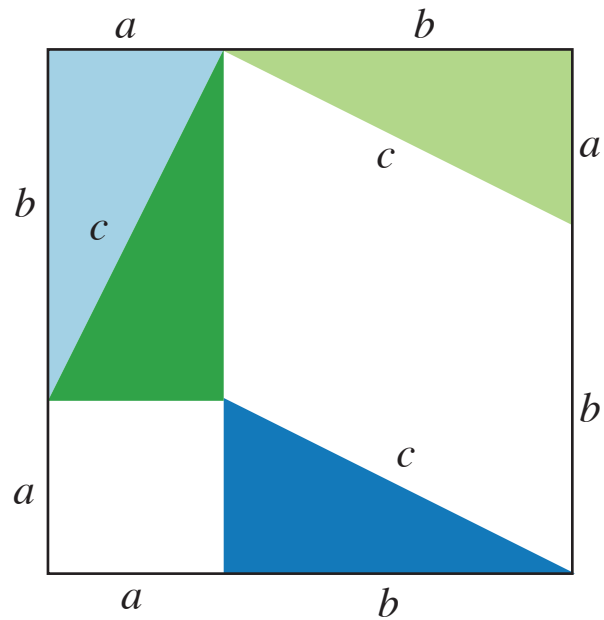
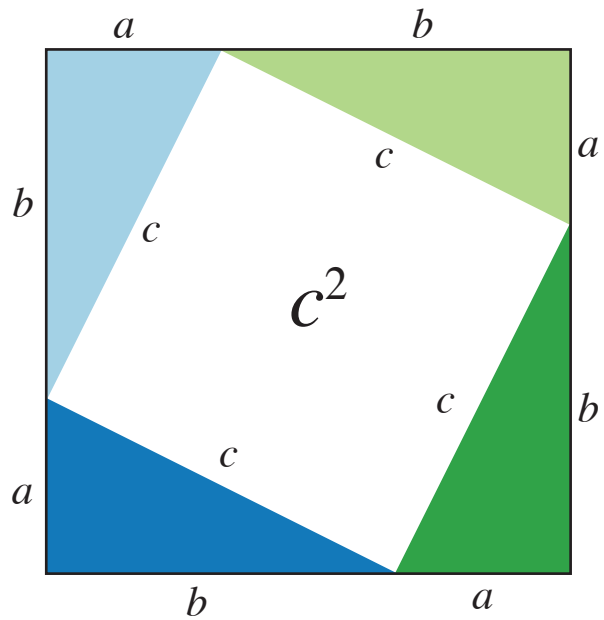


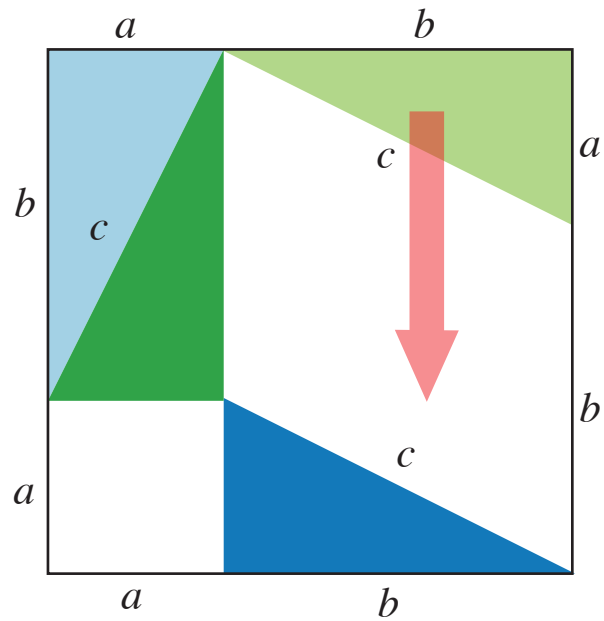
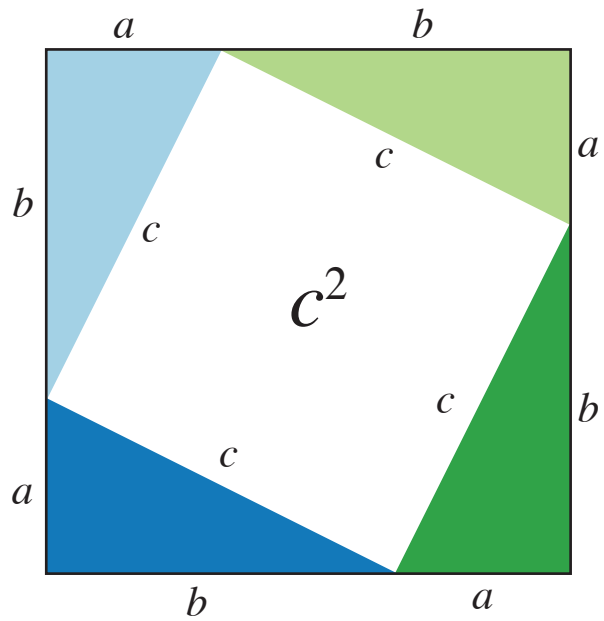




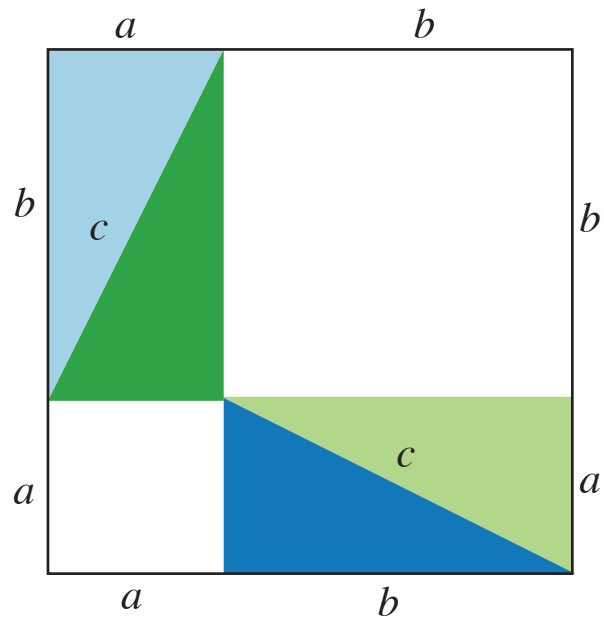
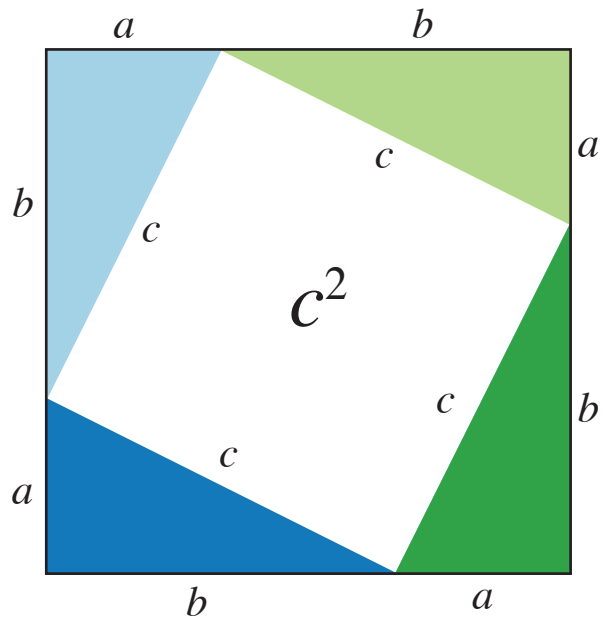


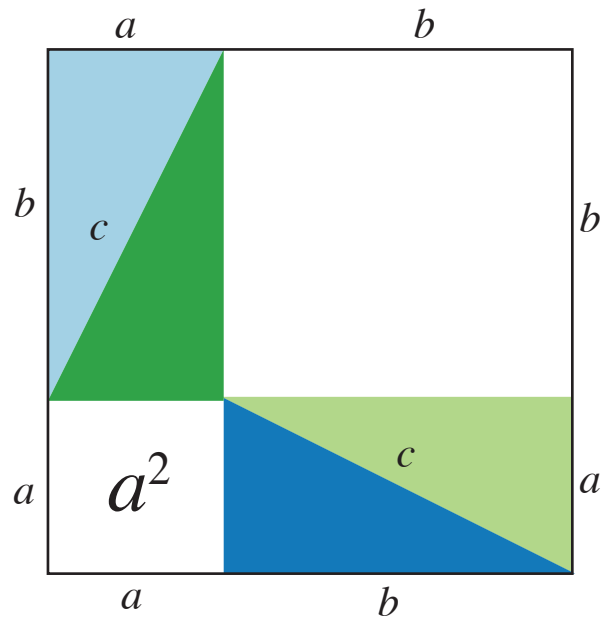
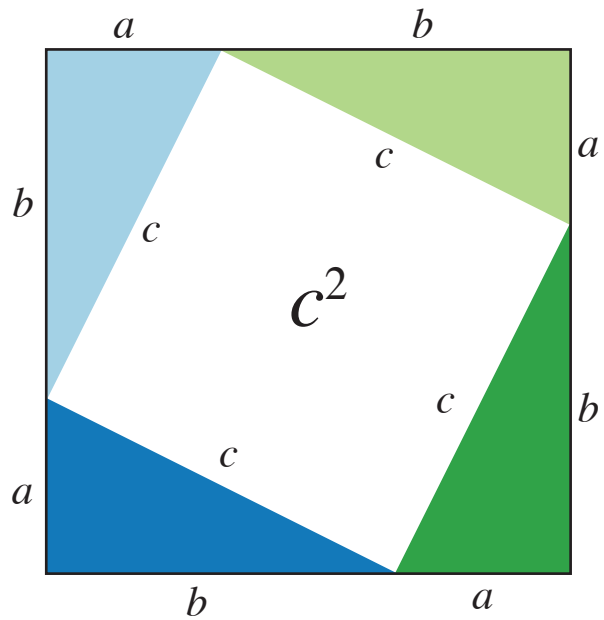


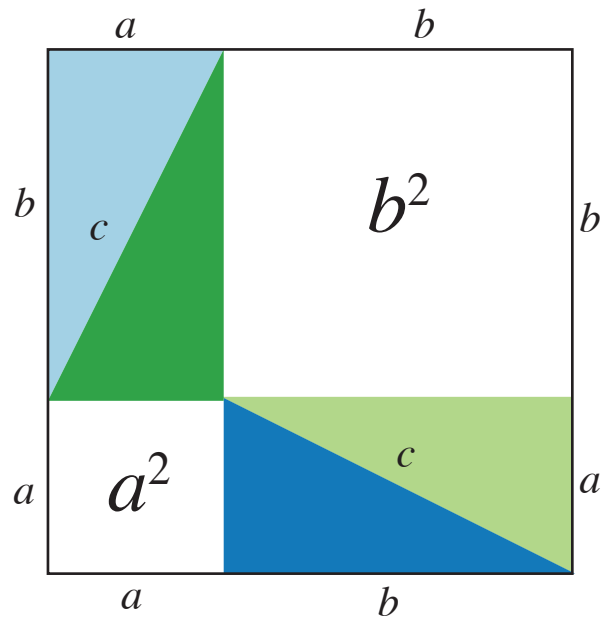
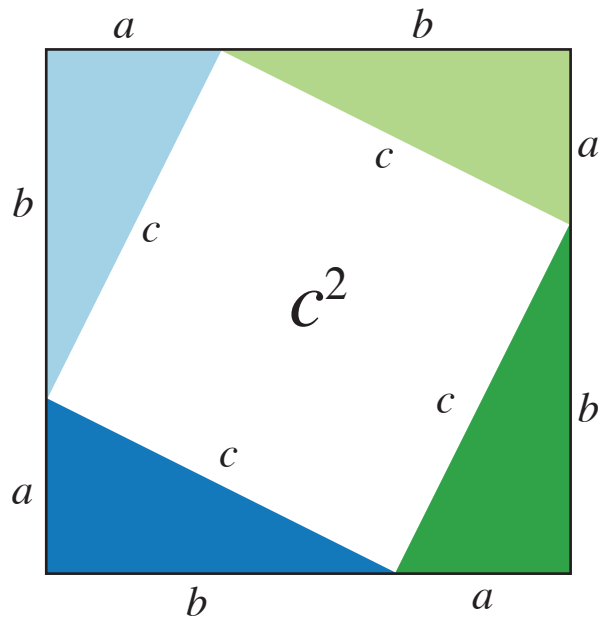




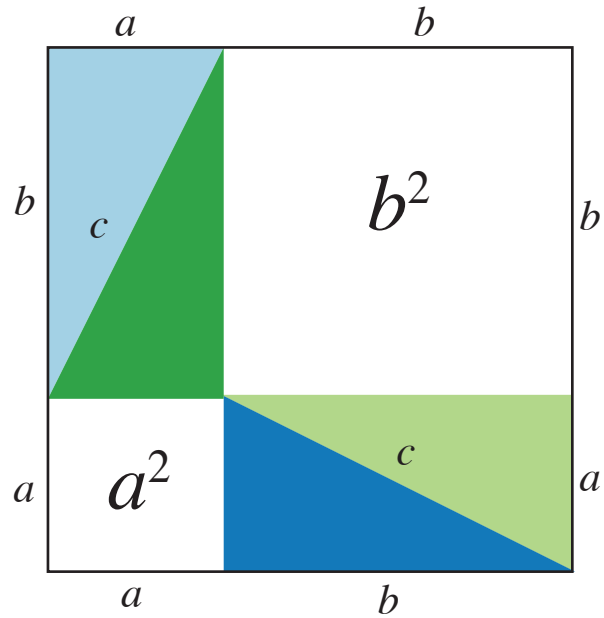
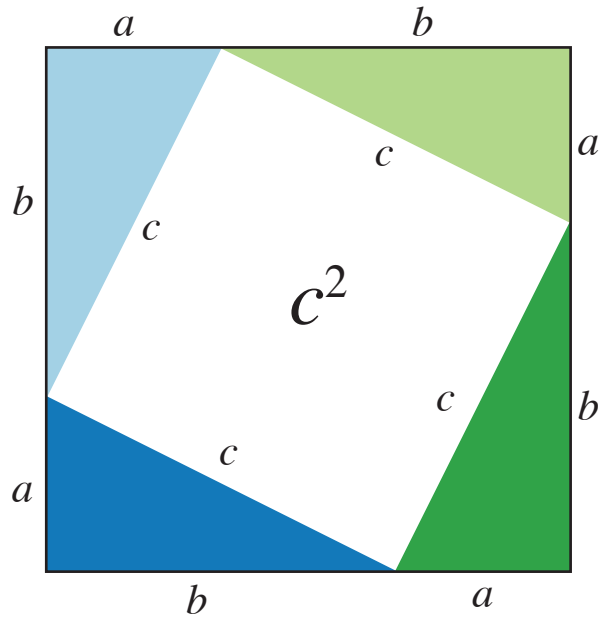








$$a^2 + b^2 = c^2$$





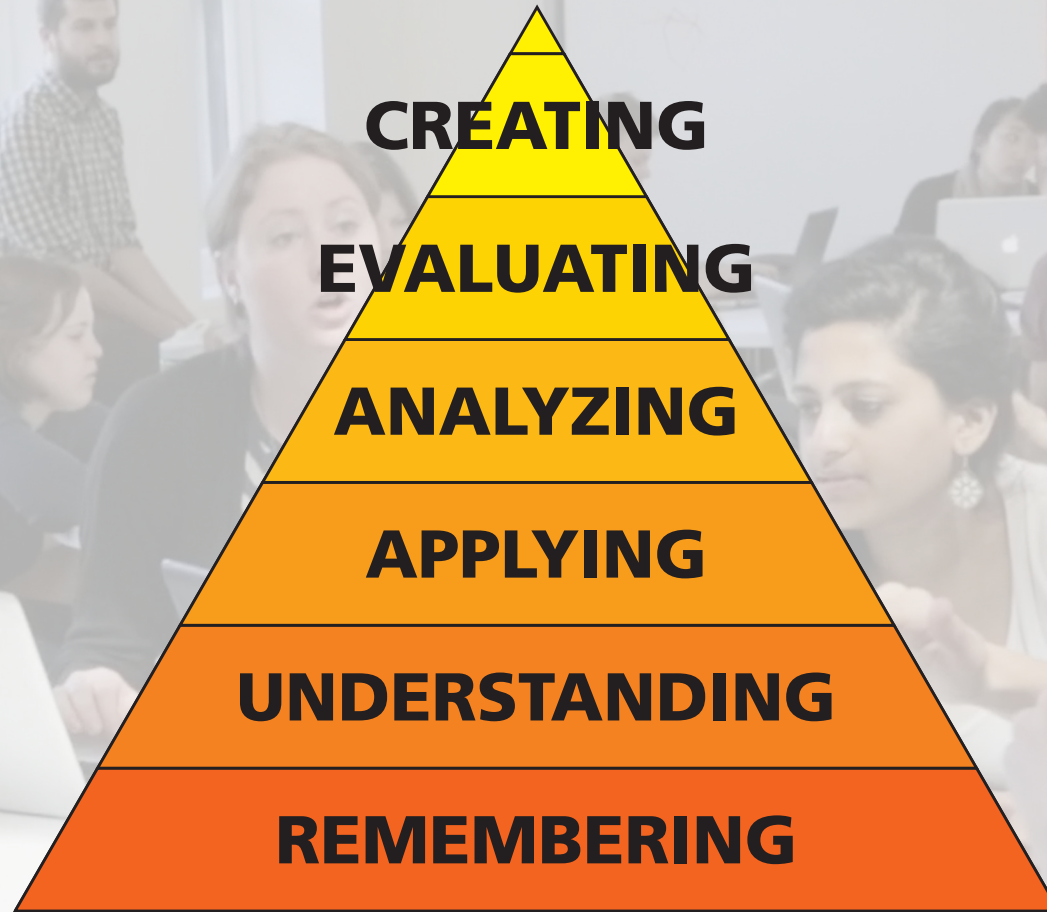
**six questions culled from various  
lesson plans on the Pythagorean theorem**



**task: classify them using Bloom's taxonomy**

**1** context

**2** classify



**1** context

**2** classify

use this link to see, classify, and rank the six questions

[http://bit.ly/qw\\_rank](http://bit.ly/qw_rank)



**1** context

**2** classify



## Weak question

A group of people in a classroom or office setting. In the foreground, a woman with dark hair is speaking and gesturing with her hands. To her left, another woman is looking at a laptop. In the background, several other people are working at desks with laptops. The scene is brightly lit, likely by natural light from windows.

**1** context

**2** classify

## Weak question

1. What does  $c$  equal in the following equation?  $3^2 + 4^2 = c^2$

1 context

2 classify

## Weak question

1. What does  $c$  equal in the following equation?  $3^2 + 4^2 = c^2$

1. (improved) Calculate the hypotenuse of a right triangle with one leg equal to 3 and one leg equal to 4.

1 context

2 classify

## Weak question

5. Which of the following is the Pythagorean theorem?

a)  $a + b = c$

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

c)  $a^2 + b^2/c^2$

d)  $y = mx + b$

1 context

2 classify

## Weak question

5. Which of the following is the Pythagorean theorem?

a)  $a + b = c$

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

c)  $a^2 + b^2/c^2$

d)  $y = mx + b$

5. (improved) What is the Pythagorean theorem?

1 context

2 classify

**Weak question... or... strong question?**

**2. Ana plays goalie for a soccer team competing in the FIFA World Cup. Her coach asks her to warm up by running from one corner of the field to the exact middle of the field. About how far does she need to run?**

- a) 13 m**
- b) 66 m**
- c) 110 m**
- d) 185 m**

**1 context**

**2 classify**

**Weak question... or... strong question?**

**2. (improved) Ana plays goalie for a soccer team competing in the FIFA World Cup. Her coach asks her to warm up by running from one corner of the field to the exact middle of the field. About how far in meters does she need to run?**

**1 context**

**2 classify**

## Strong question

**3. To get from his high school to his home, Brian travels 5.0 miles east and then 4.0 miles north. When Jasmine goes to her home from that same high school, she travels 8.0 miles east and 2.0 miles south. What is the approximate measure of the shortest distance between Brian's home and Jasmine's home?**

**1 context**

**2 classify**





**task: improve each of the six questions**

**1** context

**2** classify

**3** improve

working in groups, improve the questions  
so they score higher on Bloom's taxonomy

[http://bit.ly/qw\\_improve](http://bit.ly/qw_improve)



**1** context

**2** classify

**3** improve

here is a copy of my analysis

[http://bit.ly/qw\\_analysis](http://bit.ly/qw_analysis)



**1** context

**2** classify

**3** improve



**what are *your* questions testing?**

summary of links from this workshop

[http://bit.ly/qw\\_links](http://bit.ly/qw_links)



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