

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

Mathematics for Computer Science
6.042J/18.062J

<http://courses.csail.mit.edu/6.042>

WELCOME!
Prof. Albert R Meyer

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Quick Summary

1. Fundamental Concepts of Discrete Mathematics (*sets, relations, proof methods,...*)
2. Discrete Mathematical Structures (*graphs, trees, counting...*)
3. Discrete Probability Theory

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Vocabulary

Quickie:

What does "discrete" mean?
(\neq "discreet")

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Online Tutor Registration

- TP.1: Registration **asap**
- not later than **Saturday, 9AM** for table assignment

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Reading Assignment

- Courseinfo on web page **asap**
- Notes Chapters 1 & 2 **asap**
- Ch. 3, 4.1–4.7 **next week**
- Reading Comments
-- using online system **NB**

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Course Web site

- <http://courses.csail.mit.edu/6.042>
- announcements
 - class schedule
 - notes, slides,...
 - course organization
 - grading info

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Lecture & Team Problems

Three 1.5 hour class sessions:
 • 1/2 hour overview lecture,
 • then team problem-solving.

Team participation counts
 20% of final grade

Teams assigned by Monday



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Active Lectures

Say "hello" to your
 neighbors —you'll be
 working with them



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Active Lectures

Quickie question:
 Where was your
 neighbor born?



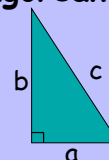
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Getting started: Pythagorean theorem



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

Familiar? **Yes!**

Obvious? **No!**



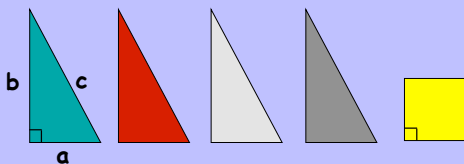
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A Cool Proof



Rearrange into:

- (i) a $c \times c$ square, and then
- (ii) an $a \times a$ & a $b \times b$ square



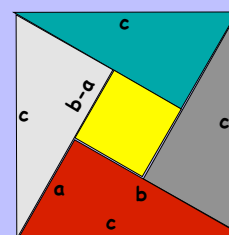
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A Cool Proof



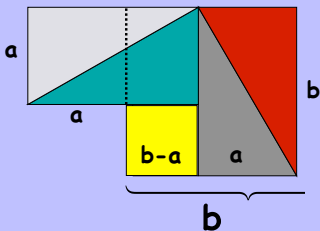
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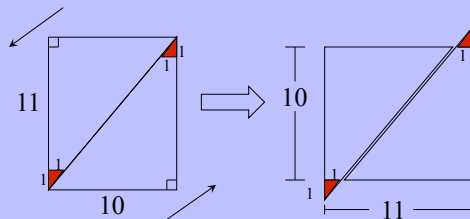
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A Cool Proof



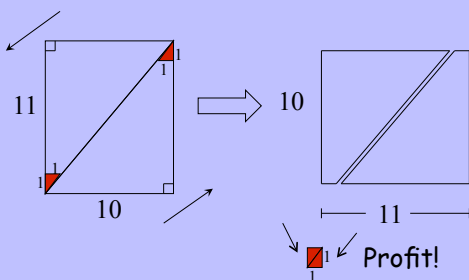
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A False Proof: Getting Rich By Diagram



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A False Proof: Getting Rich By Diagram

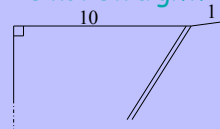


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Getting Rich

The bug:

 are not right triangles!
 So the top and bottom line of the "rectangle" is not straight!



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1 = -1 ?
 pictures are not the only
 source of false proofs

$$1 = \sqrt{1} = \sqrt{(-1)(-1)} = \sqrt{-1}\sqrt{-1} = (\sqrt{-1})^2 = -1$$

Moral:

1. Calculation is a risky substitute for understanding.
2. Be sure you know the rules.

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Consequences of $1 = -1$

$$\frac{1}{2} = -\frac{1}{2} \quad (\text{multiply by } \frac{1}{2})$$

$$2 = 1 \quad (\text{add } \frac{3}{2})$$

*"Since I and the Pope are clearly 2,
 we conclude that I and the Pope are 1.
 That is, I am the Pope."*

-- Bertrand Russell

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Consequences of $1 = -1$

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copyright restrictions.

Bertrand Russell (1872 - 1970)

(Picture source: <http://www.users.drew.edu/~j1and/brrr.htm>)



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Team Problems

Problems

1-3



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