

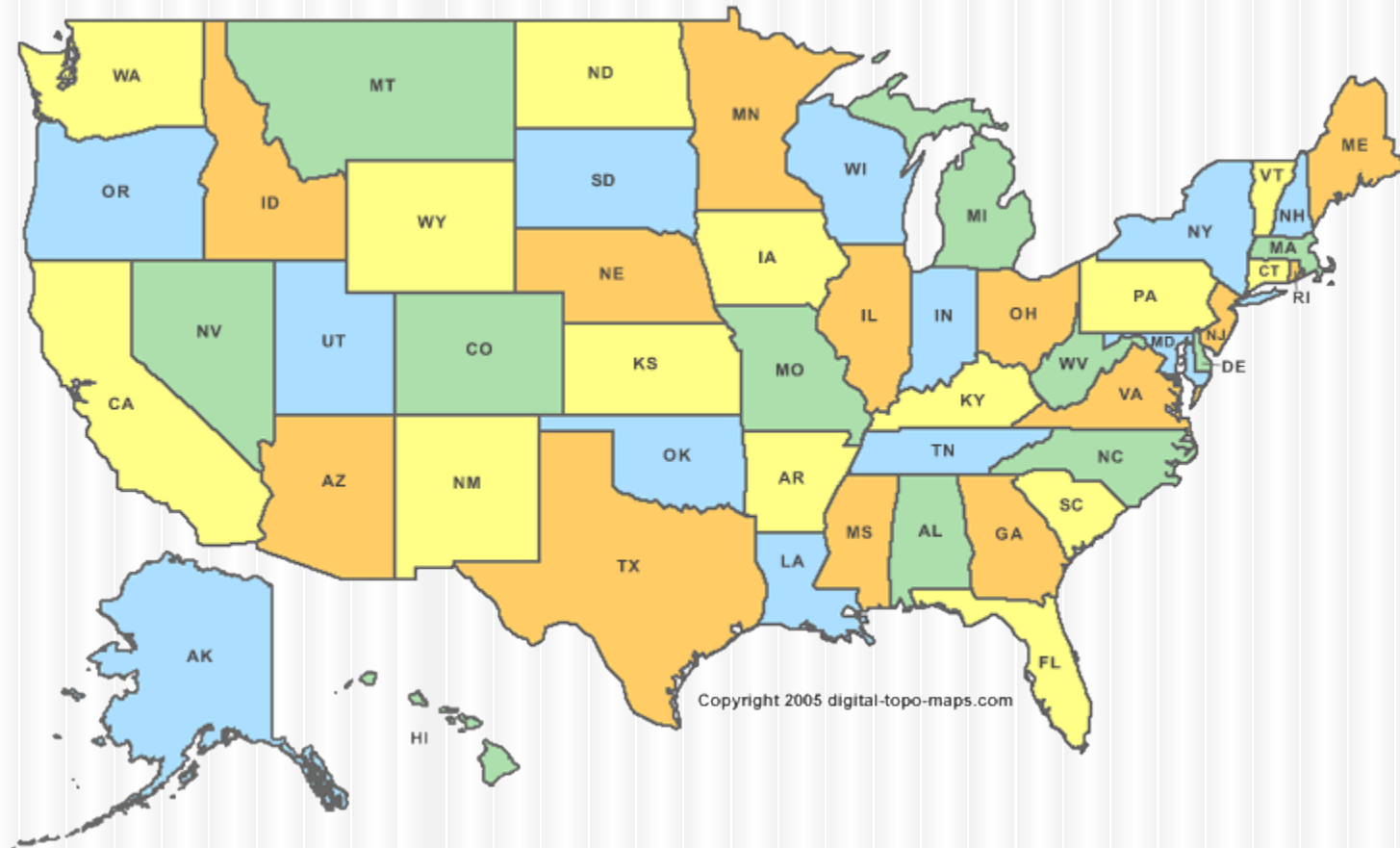
# Menu of Pythagorean Delights

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*NCTM National Conference 2013*  
*Denver, CO*

Amy Keller, Curriculum, Instruction and Assessment in Mathematics, Grant Wood AEA  
Beth Hahn, 7th Grade Mathematics, Clear Creek-Amana CSD  
Brenda Willis, 8th Grade Mathematics, Clear Creek-Amana CSD

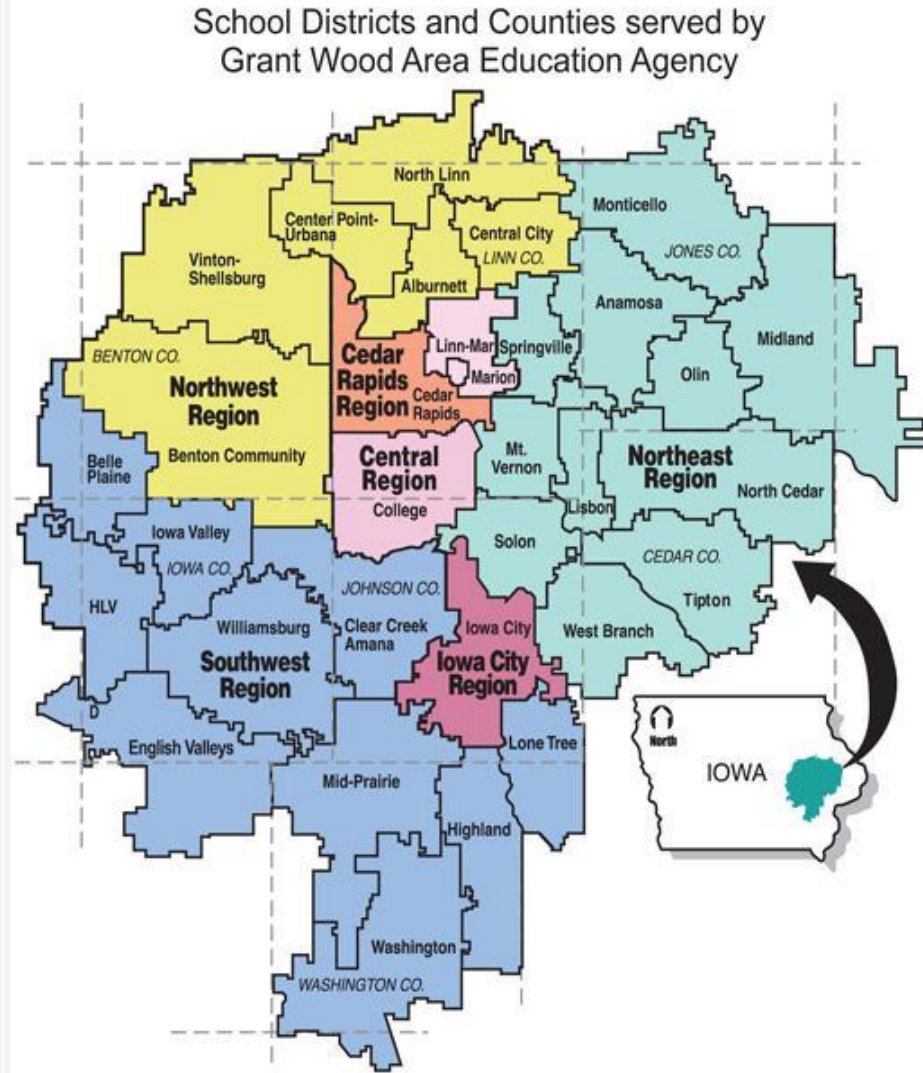
# Where in the world is Iowa?



# Iowa Area Education Agencies



Iowa Area Education Agencies are regional service agencies which provide school improvement services for students, families, teachers, administrators and their communities. The AEAs work as educational partners with public and accredited, private schools. Agency staff members, school staff and families work together to help all children reach their potential.



# Every Student Counts

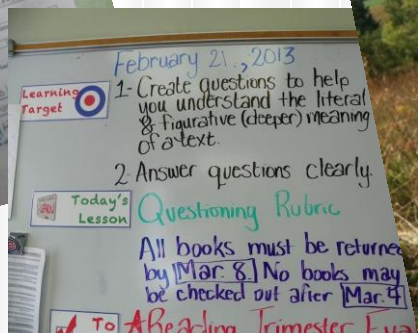
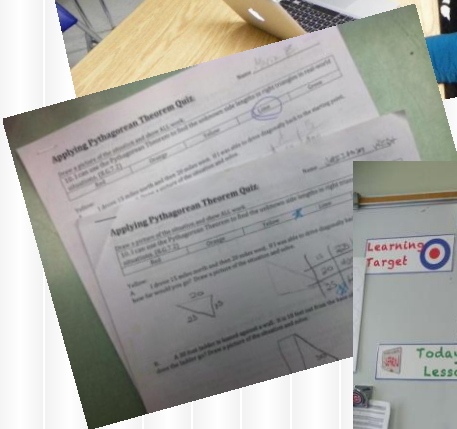
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# Teaching for Mathematics ..... Understanding .....



# Clear Creek Amana Schools



# Iowa Core Mathematics

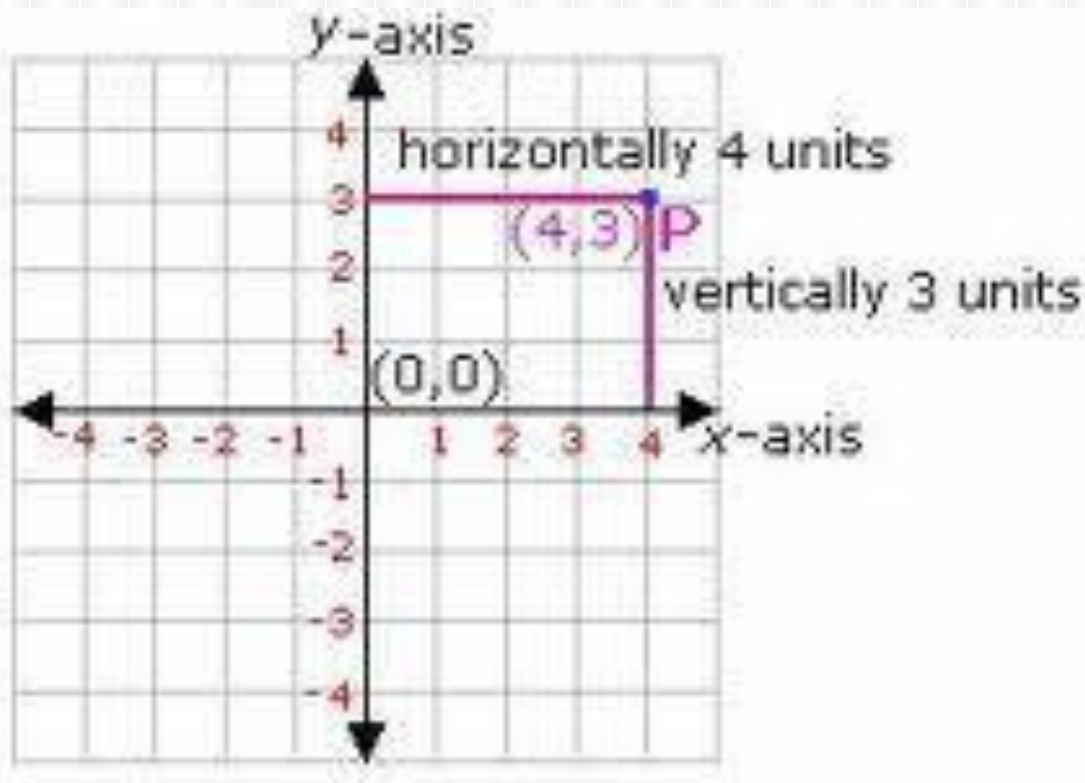
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**Iowa CORE**



To faithfully implement Iowa Core Mathematics requires teaching with rich mathematical tasks

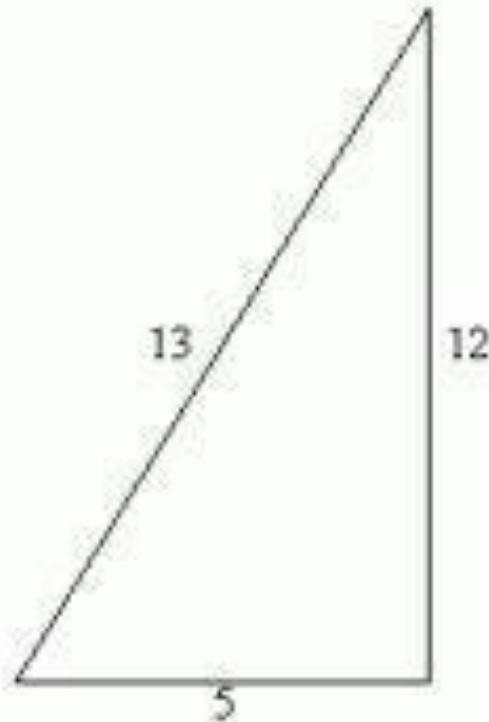
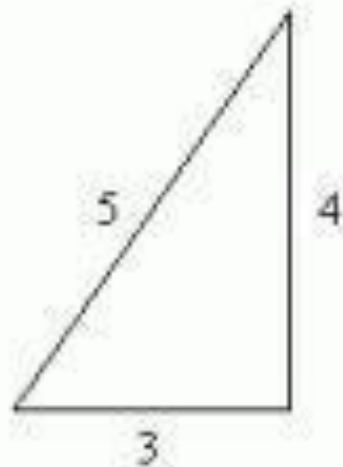
# Starting in 6th grade...





# Then 7th grade...

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# Understand and apply the Pythagorean Theorem

Explain a proof of the Pythagorean Theorem and its converse (8.G.6)

Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions (8.G.7)

Apply the Pythagorean Theorem to find the distance between two points in a coordinate system (8.G.8)

# On to High School...

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## CONCEPTUAL CATEGORIES

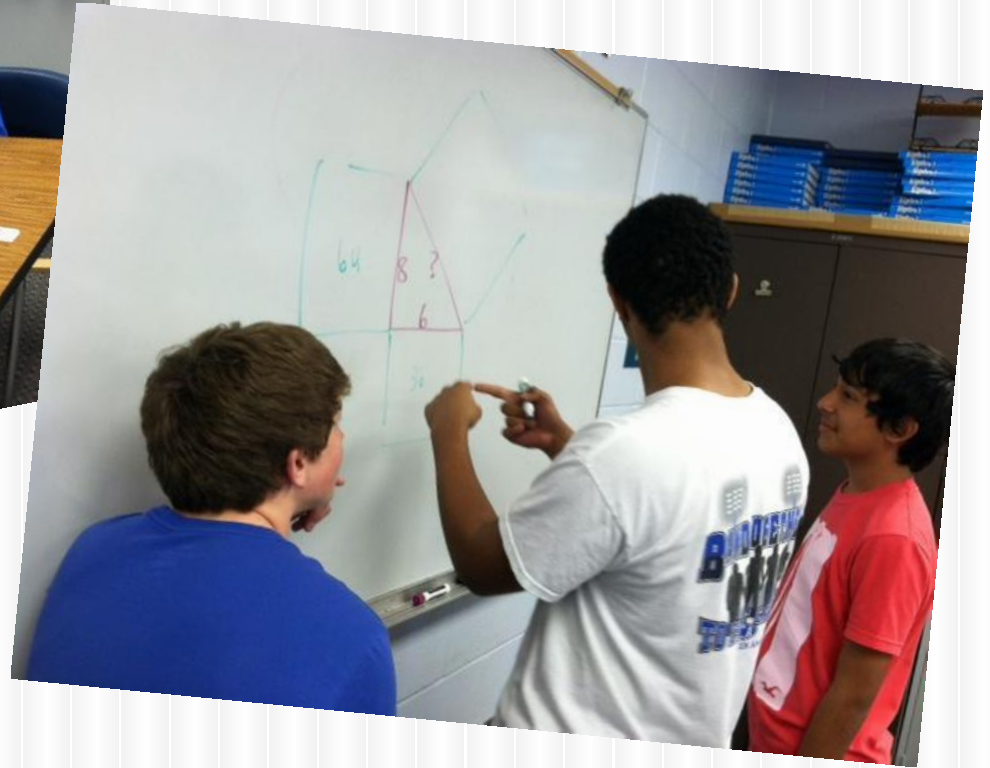
**ALGEBRA**

**FUNCTIONS**

**GEOMETRY**

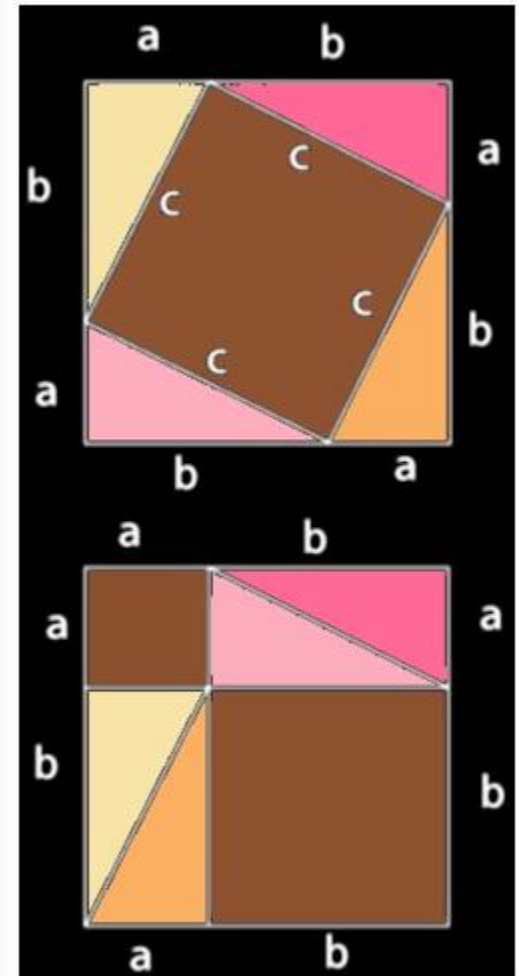
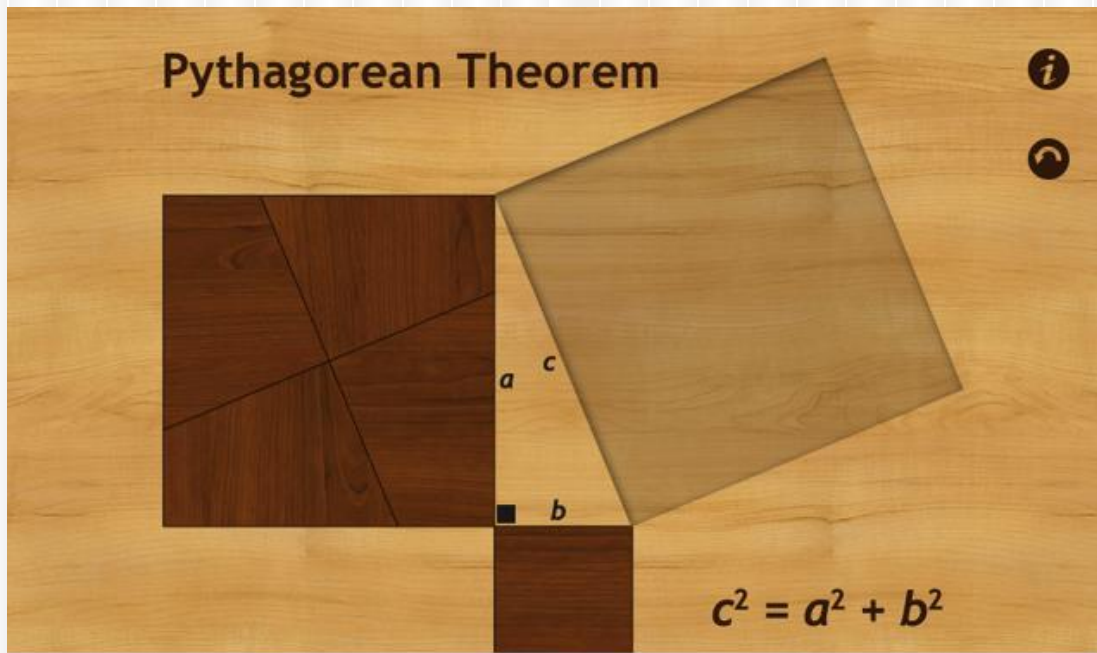
# Menu of Pythagorean Delights

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# Proofs

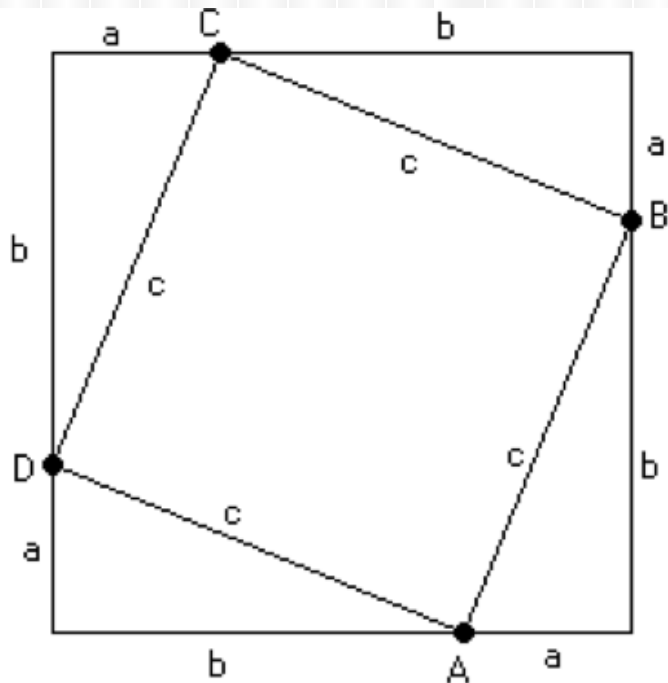
- Pieces of Squares
- Perigal's Puzzle - Mathematical Etudes



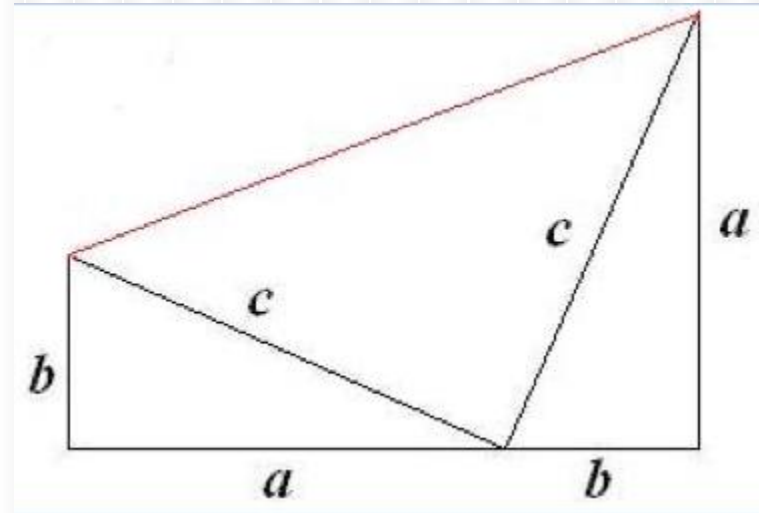
# Difficult Proofs

Students with experience multiplying binomials.

Area in Two Ways



President Garfield's Proof



# Application

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- Books for Sale
- Diagonal Transport
- 5 Foot Pole
- Deck Stairs #1 & #2
- Sneaky Sally - Baseball
- Lawn Fertilizer
- Broken TV
- Pythagoras Game (iPad)



# Books for Sale

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You wrote a book! You are driving to several bookstores for a book signing.  
Find the distance back home.

Tools needed: Graph paper

Difficulty: Easy





# Diagonal Transport

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Pole vaulter is moving and needs to find the smallest/cheapest moving truck to use but has some LONG poles that have to fit in the truck!

Tools: Internet access

Difficulty: Easy



# 5 Foot Pole

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Trying to decide if your wall is perpendicular to the floor using a 5 foot pole!

Tools: Tape Measure and 5 foot pole

Difficulty: Moderate



# Deck Stairs #1 & #2

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Building stairs off your deck but you need to figure out how many steps you will have and how long the stringer will be!

Tools: Internet access (possibly)

Difficulty:       #1: Moderate  
                      #2: Difficult



# Sneaky Sally - Baseball

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Can you beat the throw to 2nd base? Students will figure out the distance between different positions on the field.

Tools: None

Difficulty:           Moderate



# Lawn Fertilizer

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Lawn fertilizing company needs to find the area of an oddly shaped yard.

Tools: None

Difficulty: Moderate



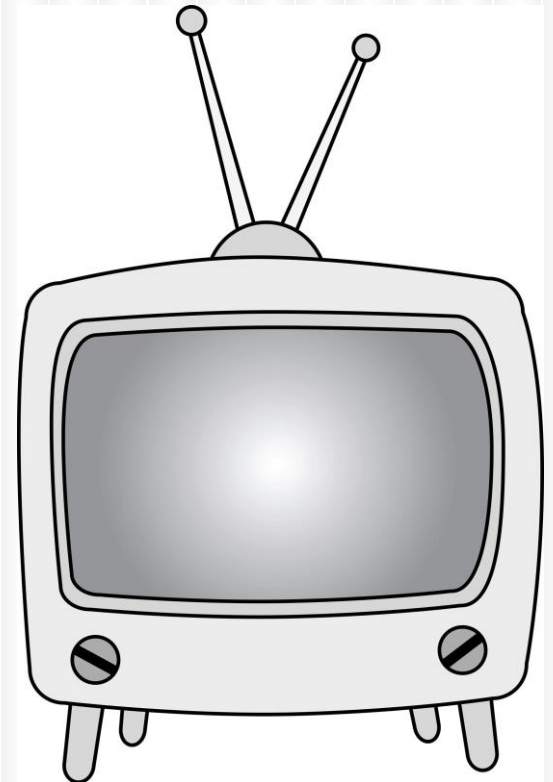
# Broken TV

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Time to get a new tv! But you are told that in order to be happy with your new widescreen tv, you need to buy a tv with the same height as your old one!  
What size should you buy?

Tools: None

Difficulty: Difficult



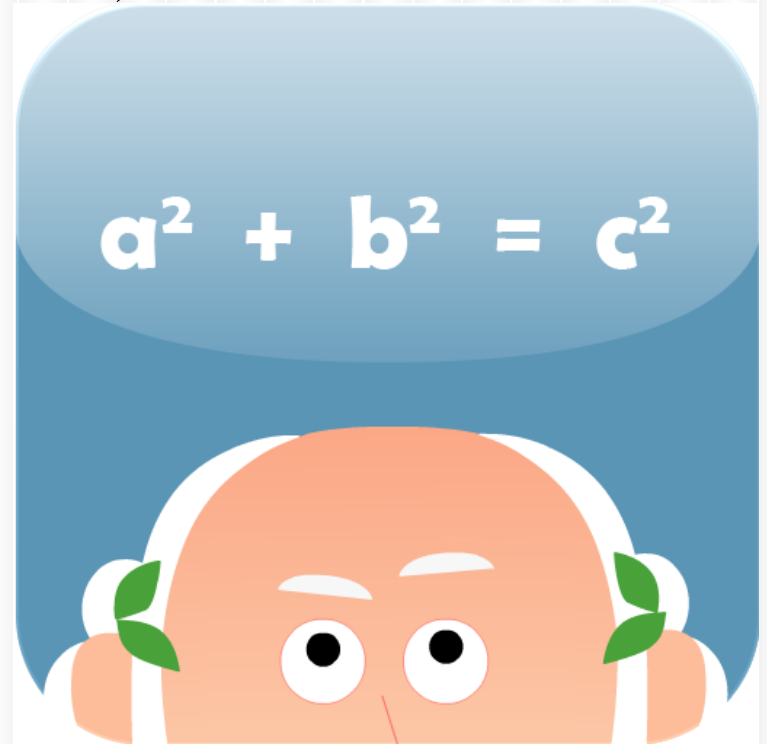
# Pythagoras Game (iPad)

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A mathematical game that has changed traditional problems into a fun and challenging game.

Tools: iPad and application by Manolin (99 cents)

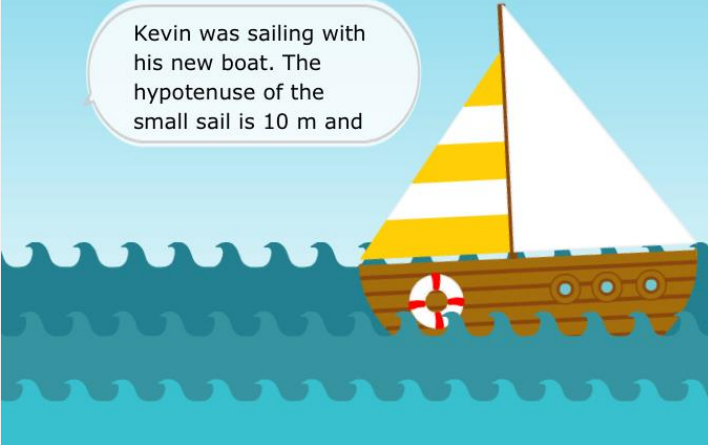
Difficulty: Levels increase in difficulty



# Pythagoras Game



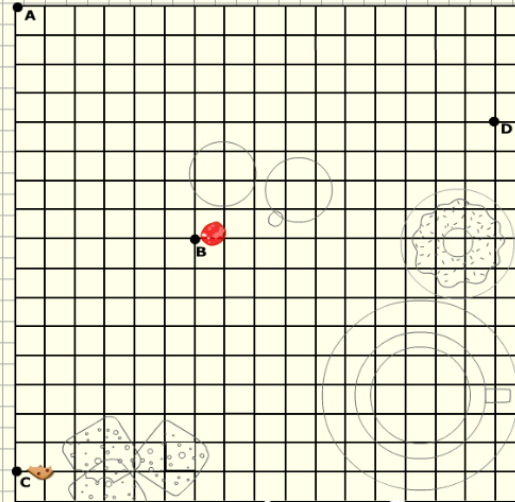
Kevin was sailing with his new boat. The hypotenuse of the small sail is 10 m and



Hint

0

Back





# Extensions

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Circle the Wagons	Proving the Pythagorean Theorem works with the area of half circles also!
How Far Is it?	Finding the distance between 2 points.
Join the Dots	Finding the possibilities of right triangles with a set hypotenuse.
Drawing Stringers	Learn how to use a framing square to build the stringer on a set of stairs.
Wheel of Theodorus	Students can use the Pythagorean Theorem to explore irrational numbers.

# Where can I find good activities?

NCSM Great Tasks for Mathematics

[Illustrative Mathematics](#)

[MAP Mathematics Assessment Project](#)

[Statistics Education Web](#)

[Core Math Tools](#)

[Illuminations](#)

[TI Exchange](#)

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**ALL ACTIVITIES ARE IN GOOGLE DOCS**

[NCTM Denver 2013](#)