Welcome Back MYP Math 9!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: 10/9 Topic: No HW - Unit 1 Test Friday	0 1 2	
Tuesday Date: _____ Topic: _____	0 1 2	
Wednesday Date: _____ Topic: _____	0 1 2	
Thursday Date: _____ Topic: _____	0 1 2	
Friday Date: _____ Topic: _____	0 1 2	

Class Plan:

1) **Mathematician Monday!**
2) **Warm-up**
3) **Investigation**
4) **Joke break :)**
5) **Notes, examples**
6) **Practice**

Mathematician Monday!

Robert Eugene Megginson

- Ethnicity: American Indian, Tribe: Oglala Sioux
- Gender: M
- Year of Birth: 1948
- Place of Birth: Washington, IL

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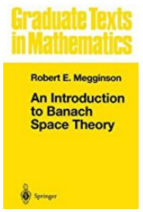

Education

- PhD Institution: Univ. of IL - Urbana-Champaign, 1984
- Dissertation Title: The semi-Kadec-Klee Condition and Nearest-Point Properties of Sets in Normed Linear Spaces
- Advisor: Mahlon M. Day
- AM Institution: University of Illinois, 1983
- BS Institution: University of Illinois, 1969

Mathematician Monday!

Biography

Robert Eugene Megginson grew up in a family that enjoyed and valued mathematics, which is certainly one of the reasons for his interest in the field. His maternal Native American grandfather never attended a day of formal school in his life, but was very well self-educated and was fascinated by mathematics. He loved to give Megginson small mathematical problems to work out (e.g., "If you have $2.00 and want to buy 17 stamps of the following denominations, ... "), and his interest in these sorts of problems certainly rubbed off. Megginson's father, whose family is from England, has a bachelor's degree in physics and mathematics, and that also influenced his decision to go into mathematics.

Mathematician Monday!

However, Megginson did not do so immediately after getting his first college degree. After receiving his bachelor's degree in physics in 1969, he worked for eight years as a computer systems software specialist for Roper Corporation in Kankakee, Illinois, a Fortune 500 corporation that at the time primarily manufactured home appliances and lawn tractors. Before leaving to pursue his doctorate in mathematics, he had risen to the position of Lead Systems Software Sp

For the last decade, much of his interest and time have been absorbed by the problem of the serious underrepresentation of minorities in mathematics. One of only about a dozen Native Americans who are known to hold doctorates in mathematics, Megginson has served on and chaired numerous professional and national committees that address this problem. In addition to serving as the co-chair of the Mathematical Association of America (MAA) Committee on Minority Participation in Mathematics, at this time (1998) he also chairs the MAA's Coordinating Council on Human Resources, as well as the Human Resources Advisory Committee of the Mathematical Sciences Research Institute at the University of California at Berkeley. He has been an advisor to many programs of the American Indian Science and Engineering Society and is a Sequoyah Fellow of the organization.

Mathematician Monday!

In addition to his committee and other advisory work on the underrepresentation problem, he has also spent much time working directly with students of color to help them succeed in mathematically-based fields. Since 1992, he has helped design and has worked every summer in programs for precollege students at Turtle Mountain Community College, a tribally controlled college of the **Turtle Mountain Chippewa Nation in North Dakota.** The purpose of these programs is to keep Native American students in the Educational pipeline leading to college degrees in mathematics and related fields, and the programs are accumulating a record of success in doing exactly that. Megginson has also mentored many undergraduate and graduate students of color from varied backgrounds who have gone on to receive degrees in mathematically-based disciplines.

For his record of mentoring students of color and other work on underrepresentation, he was one of ten individuals who were honored to receive the 1997 U.S. Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. This award was given in a White House ceremony in September of that year.

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Megginson has been a member of many other committees of professional organizations, primarily the MAA. In 1998, he was a member of the MAA's Presidential Task Force on NCTM Standards, Task Force on Member Services, the Advisory Board of "Math Horizons" magazine, and had just concluded a term as chair of the Committee on Trevor Evans Prizes. He was a candidate for First Vice President of the MAA in 1997 and a candidate for President of the MAA in 1999. Megginson was also the recipient of the 1999 Ely S. Parker Award of the American Indian Science and Engineering Society, AISES's highest honor, which is given each year to one Native American scientist, mathematician, or engineer for lifetime service to the Native American community and contributions to his or her field of study.

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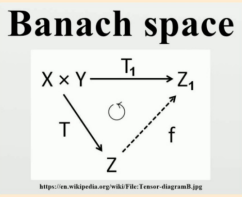
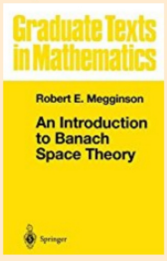
Megginson currently lives in Brighton, Michigan with his wife, Kathleen, to whom he has been married since 1978. Kathy is also a mathematician, holding a bachelor's degree in mathematics as well as a master's degree in computer science and an MBA. She has worked for several corporations as a computer systems analyst, including sixteen years with IBM in Springfield and Decatur, Illinois as a database specialist.

Megginson's most recent publication is a textbook on Banach spaces. His main mathematical area is functional analysis, specifically the geometry of Banach spaces.





Mathematician Monday!

Banach Space ~ Vector Space

Definition [edit]

A Banach space is a vector space X over the field $\mathbf{R}$ of real numbers, or over the field $\mathbf{C}$ of complex numbers, which is equipped with a norm and which is complete with respect to that norm, that is to say, for every Cauchy sequence $\{x_n\}$ in X, there exists an element x in X such that

$$\lim_{n\to\infty} x_n = x,$$

or equivalently:

$$\lim_{n\to\infty} \|x_n - x\|_X = 0.$$

The vector space structure allows one to relate the behavior of Cauchy sequences to that of converging series of vectors. A normed space X is a Banach space if and only if each absolutely convergent series in X converges.[2]

$$\sum_{n=1}^{\infty} \|v_n\|_X < \infty \quad \text{implies that} \quad \sum_{n=1}^{\infty} v_n \ \text{converges in} \ X.$$

Completeness of a normed space is preserved if the given norm is replaced by an equivalent one.

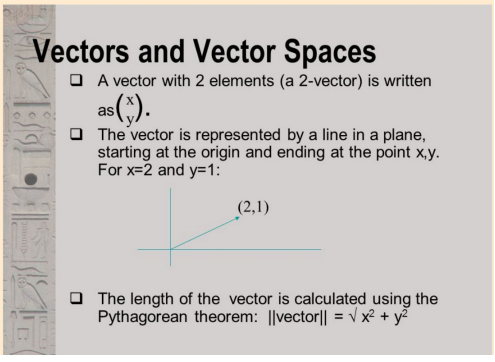
All norms on a finite-dimensional vector space are equivalent. Every finite-dimensional normed space over $\mathbf{R}$ or $\mathbf{C}$ is a Banach space.[3]

Mathematician Monday!

How are Banach spaces connected to our learning?

Unit 2: Coordinate Geometry - Distance and Pythagorean theorem

Pythagorean theorem allows us to find the length of a vector!

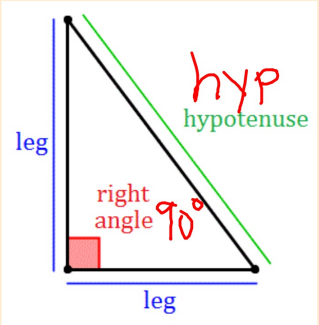


Warm-up:

How can we be sure these structures are ***safe?!?***

Think
Pair
Share

Parts of a Right Triangle



Unit 2: 10/9

Draw image in your notebook

IMPORTANT: Hypotenuse opposite the right angle!

Warm-up:

**Want to isolate unknown
Take square root at end**

The sum of 8 and a number squared is 24.

1) $x^2 + 8 = 24$

$-8 \quad -8$

$\sqrt{x^2} = \sqrt{16}$

$X = 4$

$X = 4$

$X = -4$

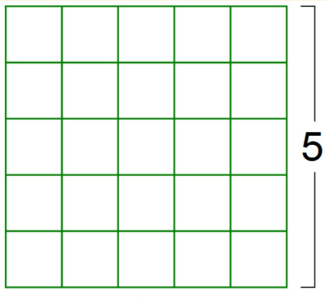
$(-4)^2 = 16$

$(4)^2 = 16$

$X = \pm 4$

"Squaring" operation... is referring to squares!

"Square root" is the inverse operation



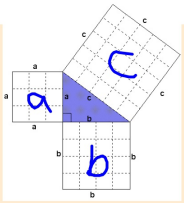
$5 \times 5 = 25$

$5^2 = 25$

$\sqrt{25} = 5$

Objective: Explore Pythagorean Theorem. Prove Pythagorean Theorem

Show that the length of the longest side (*hypotenuse*) squared, is equal to the sum of the squares of the other two side lengths.



SUPPLIES:

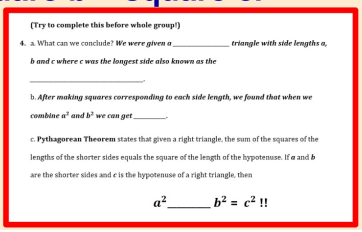
- **Blue Handout**- right triangle and three squares
- scissors

1) Cut out squares *a, b, c* .

2) Show square a + square b = square c.

Recycle paper scraps in buckets!

WHEN DONE: Conclude in #4



(Try to complete this before whole group!)

4. a. What can we conclude? ***We were given a _____ triangle with side lengths a, b and c where c was the longest side also known as the _____.***

b. ***After making squares corresponding to each side length, we found that when we combine a^2 and b^2 we can get _____.***

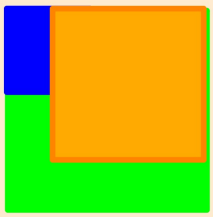
c. **Pythagorean Theorem** states that given a right triangle, the sum of the squares of the lengths of the shorter sides equals the square of the length of the hypotenuse. If ***a*** and ***b*** are the shorter sides and ***c*** is the hypotenuse of a right triangle, then

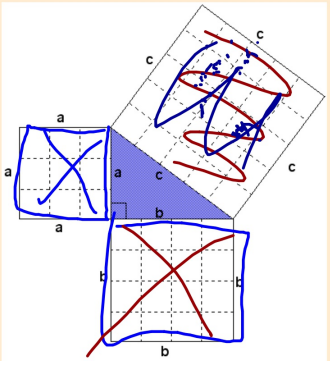
a^2 _____ $b^2 = c^2$!!

INVESTIGATION: Pythagorean Theorem

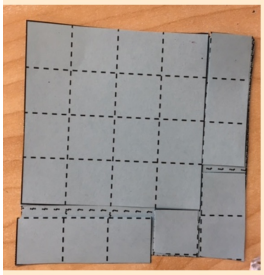
Objective: Explore Pythagorean Theorem.

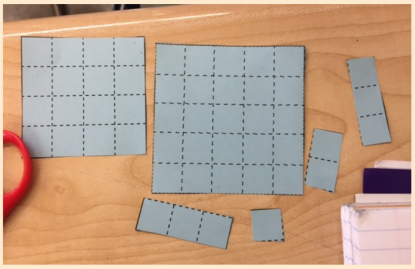
Show that the length of the longest side (*hypotenuse*) squared, is equal to the sum of the squares of the other two side lengths.





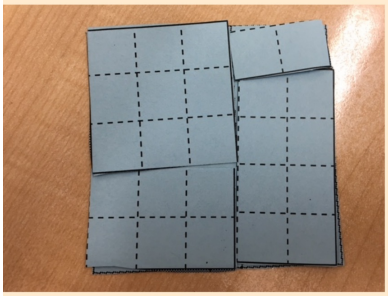
INVESTIGATION: Pythagorean Theorem

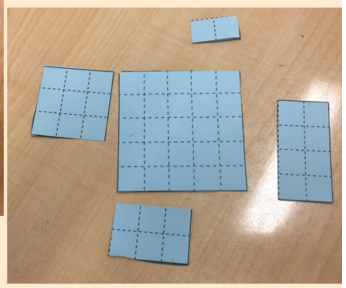




Recycle paper scraps in buckets!

INVESTIGATION: Pythagorean Theorem





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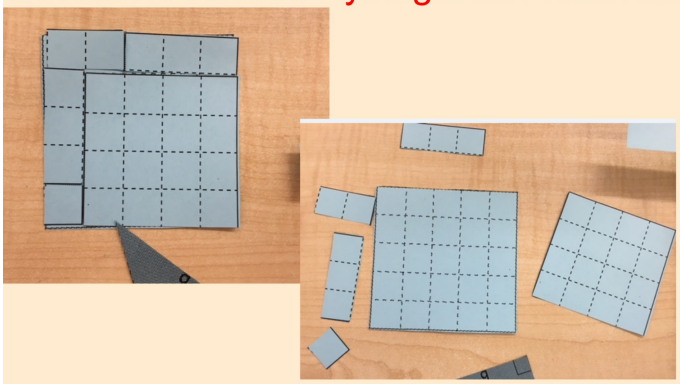
INVESTIGATION: Pythagorean Theorem



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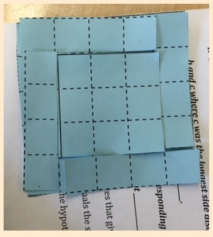
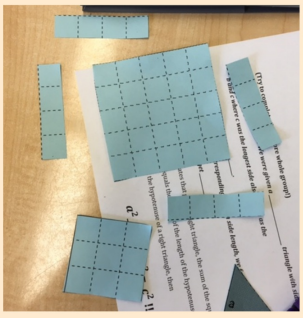
INVESTIGATION: Pythagorean Theorem





Recycle paper scraps in buckets!

INVESTIGATION: Pythagorean Theorem

(Try to complete this before whole group!)

4. a. What can we conclude? ***We were given a*** right ***triangle with side lengths a, b and c where c was the longest side also known as the*** hypotenuse.

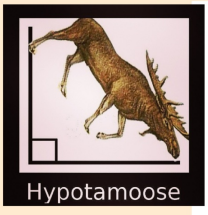
b. ***After making squares corresponding to each side length, we found that when we combine a^2 and b^2 we can get*** c^2.

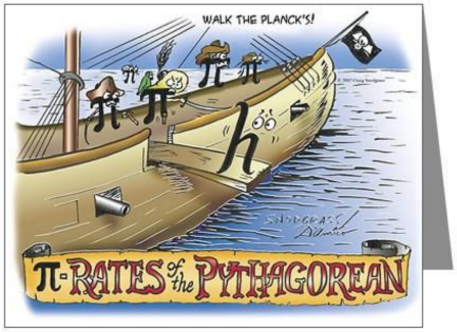
c. **Pythagorean Theorem** states that given a right triangle, the sum of the squares of the lengths of the shorter sides equals the square of the length of the hypotenuse. If ***a*** and ***b*** are the shorter sides and ***c*** is the hypotenuse of a right triangle, then

$$a^2 + b^2 = c^2 \text{ !!}$$

Recycle paper scraps in buckets!

4) Joke break :)





Pythagorean Theorem Proof

...with cut-outs...

https://www.youtube.com/watch?v=dxyti_wCWaE

With water! **https://www.youtube.com/watch?v=CAkMUdeB06o**

Reflection...

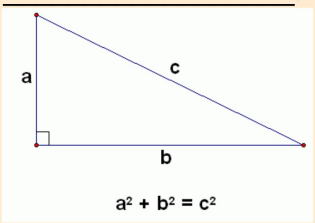
- What did you learn in this activity?
- How is this different than the last time you explored $a^2 + b^2 = c^2$?
- What was fun?
- What was difficult?

What can we conclude?

In Notes Notebook

The Pythagorean Theorem

In a right triangle, the sum of the squares of the lengths of the legs equals the square of the length of the hypotenuse. If *a* and *b* are the lengths of the legs, and *c* is the length of the hypotenuse, then _____.



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

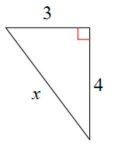
Example #1: Use the **Pythagorean Theorem** to find the length of the missing side.

1. Label each side.
2. Rewrite Pythagorean Theorem.

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

3. Use formula to solve for unknown.

1)



$x^2 = 3^2 + 4^2$

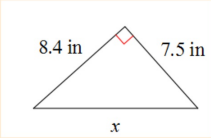
$x^2 = 9 + 16$

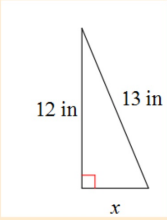
$x^2 = 25$

$x = 5$

Examples! Use the **Pythagorean Theorem** to find the length of the missing side.

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



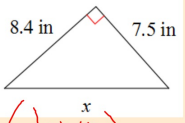


Examples

Use the **Pythagorean Theorem** to find the length of the missing side.

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

1)



(hyp)

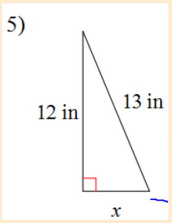
$8.4^2 + 7.5^2 = x^2$

$70.56 + 56.25 = x^2$

$\sqrt{126.81} = \sqrt{x^2}$

$11.26 \approx x$

5)



$12^2 + x^2 = 13^2$

$144 + x^2 = 169$

$-144 \quad -144$

$\sqrt{x^2} = \sqrt{25}$

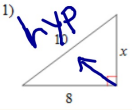
$x = 5$

Unit 2 Coordinate Geometry $a^2+b^2=c^2$ Name_____ ID: 1

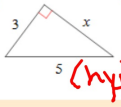
Introduction to the Pythagorean Theorem Date_____ Period____

Find the missing side of each triangle. Round your answers to the nearest tenth if necessary.

1) hyp



2)



(hyp)

$x^2 + 3^2 = 5^2$

$x^2 + 8^2 = 10^2$

$x^2 + 64 = 100$

$-64 \quad -64$

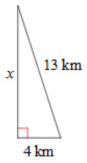
$x^2 = 36$

$\sqrt{x^2} = \sqrt{36}$

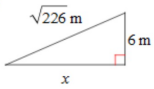
$x = 6$

Find the missing side of each triangle. Leave your answers in radical form or round answers to the nearest hundreth.

3)



4)



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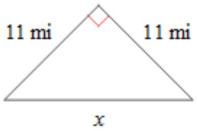
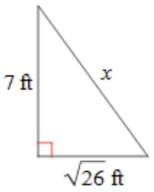
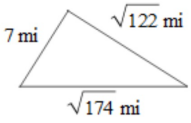


6)

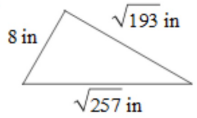


State if each triangle is a right triangle.

7)



8)



Exercises for tonight...

- Pythagorean worksheet

Solutions

1) 6	2) 4	3) $3\sqrt{17}$ km	4) $\sqrt{190}$ m
5) $11\sqrt{2}$ mi	6) $5\sqrt{3}$ ft	7) No	8) Yes

After school help:
Mr. Oberembt W101
OR Ms. Berg W125