

learning focus:

- ✓ use the pythagorean theorem and its converse to solve problems
- ✓ use models of the pythagorean theorem
- ✓ determine the distance between points on a coordinate plane using the pythagorean theorem

PYTHAGOREAN THEOREM UNIT

8 DAY CCSS-ALIGNED UNIT

8th
GRADE



A MANEUVERING THE MIDDLE ® RESOURCE

PYTHAGOREAN THEOREM



an 8 day CCSS-aligned unit
CCSS: 8.G.6, 8.G.7, 8.G.8

ready-to-go, scaffolded
student materials

PYTHAGOREAN THEOREM UNIT

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student friendly + real-world
application

skill application

Unit: Pythagorean Theorem
Homework 2


Name _____
Date _____ Pd _____

PYTHAGOREAN THEOREM CONVERSE

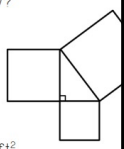
In questions 1-6, write "yes" or "no" to state whether the given side lengths would form a right triangle. Show work to support your answers.

1. 28, 53, 45	2. 4.5, 6, 7.5	3. 20, 40, 30
4. 50, 48, 14	5.	

7. Tina built a triangular sign with side lengths of 73 inches, 55 inches and 4 feet. Is the triangle a right triangle? Why or why not?



9. Which of the following could be the areas of the three squares below?



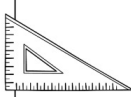
A. 12 ft^2 , 16 ft^2 and 28 ft^2
B. 8 ft^2 , 16 ft^2 and 24 ft^2
C. Both A and B
D. Neither A nor B

4. Determine if the following side lengths could form a right triangle. Justify your choice.

SIDE LENGTHS	WORK	RIGHT TRIANGLE? JUSTIFY.
12, 24, 36		
16, 9, 11		
20, 29, 21		
12.5, 7.5, 10		

Use the Pythagorean converse to help.

5. Jimmy thinks a window frame in his room looks slanted because the corner does not appear to be a 90° angle. His wife disagrees. They measured the window and found the width to be 25 inches, the height to be 30 inches, and the diagonal distance to be 39 inches. Who is correct?



7. The perimeters of three squares are shown below. Do they meet to form a right triangle?

P = 48 ft	P = 140 ft	P = 148 ft
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Summarize today's lesson:

Unit: Pythagorean Theorem
Student Handout 2

Name _____
Date _____ Pd _____

PYTHAGOREAN THEOREM CONVERSE

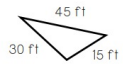
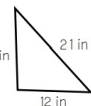
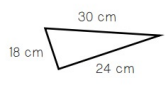
The converse of a statement switches the order of "if" and "then" in the statement. Use this to write the converse of the following statement as an example:

STATEMENT	CONVERSE
If a triangle has three equal sides, then it is an equilateral triangle.	

PYTHAGOREAN THEOREM CONVERSE

- We know that if a triangle is a right triangle, then _____. Apply the practice from above to write the converse of the Pythagorean theorem:
- The converse can be used to prove whether a triangle is a _____ triangle.

In 1-3, use the Pythagorean converse to prove whether the given triangle is a right triangle. Show all work in the first column. Then, write "yes" or "no" and justify your choice in the last column.

	WORK	RIGHT TRIANGLE? JUSTIFY.
1		
2		
3		

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scaffolded
concepts

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streamline your planning
process with unit overviews

PYTHAGOREAN THEOREM OVERVIEW



STANDARDS

- 8.G.6 Explain a proof of the Pythagorean theorem and its converse.
- 8.G.7 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.8 Apply the Pythagorean theorem to find the distance between two points in a coordinate system.

BIG IDEAS

- The side lengths of all right triangles are related in such a way that the sum of the squares of the two shorter sides equals the square of the longest side.
- The Pythagorean theorem helps determine if a triangle is a right triangle.

ESSENTIAL QUESTIONS

- What are two different ways to find the area of a right triangle?
- How are the side lengths of a right triangle related?
- How can you visualize or draw a right triangle?
- How can the Pythagorean theorem be used to find the distance between two points?



key vocabulary



vertical alignment



sample
pacing
calendar

PYTHAGOREAN THEOREM UNIT PACING GUIDE



DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
The Pythagorean Theorem	Pythagorean Theorem Converse	Applying the Pythagorean Theorem	Pythagorean Theorem Quiz	Distance on a Coordinate Plane
Student Handout 1 Homework 1	Student Handout 2 Homework 2			
DAY 6	DAY 7			
3D Applications of Pythagorean Theorem	Pythagorean Theorem Study Guide			
Student Handout 5 Homework 5	Review			

PYTHAGOREAN THEOREM UNIT OVERVIEW



TOPIC	TEACHING TIPS
Proving the Pythagorean Theorem	Visit http://illuminations.nctm.org and search "Pythagorean Review" for a visual proof of the Pythagorean theorem. The tool allows you to change the side lengths of the triangles and observe how it changes the area of the connected squares. Great for visualizing the theorem.
Pythagorean Theorem	Visit http://science360.gov and search "Pythagorean Theorem" to find a video relating the Pythagorean theorem to football.
Pythagorean Theorem Converse	Students will be tempted to argue that a triangle is a right triangle simply because it "looks" like it has a 90° angle. I try to remind them that an angle could be 89° or 91° and it would look close to a right angle, so it's important to always use the converse to be sure.
Distance on a Coordinate Plane	Visit http://kera.pbselearningmedia.org and search "Calculating Distance Using the Pythagorean Theorem" for a tool that demonstrates how the theorem is used to find distances on a coordinate plane. This would be great at the beginning of the lesson. On the same site, search "Using the Pythagorean Theorem on the Cartesian Graph" for an activity where students place animals and find their distances using the Pythagorean theorem. It allows students to check answers as they go.
3D Applications of the Pythagorean Theorem	Consider bringing in a rectangular prism box (a shoebox would work well) and allow students to measure the length and width of the base. Then use the Pythagorean theorem to calculate the diagonal of a box. Lastly, use a string or tape measure to directly measure the diagonal of the box, thus showing the students that the theorem works.

teaching
ideas



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unit study guide + assessments



quizzes



editable unit test

Unit: Pythagorean Theorem
Quiz 1

Name _____
Date _____ Pd _____


QUIZ: PYTHAGOREAN THEOREM

Show all work as you answer each question. Round solutions to the nearest tenth when necessary.



1. A rectangular parking lot has a length of 84 feet and a width of 56 feet. Which of the following could be used to find the diagonal distance across the parking lot?

A. $84^2 - 56^2 = c^2$
B. $(84 + 56)^2 = c^2$

2. Find the missing side length of the right triangle below.



4. Which of the following shows the sides of a right triangle?

A.  B. 

5. Jack has a 35-foot ladder leaning against his house, 12 feet away from his house, how many feet does the ladder reach the house?

Answers

1. _____
2. _____
3. _____
4. _____

Unit: Pythagorean Theorem
Review

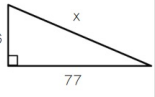
Name _____
Date _____ Pd _____

PYTHAGOREAN THEOREM STUDY GUIDE


Solve each of the problems below, and round all solutions to the nearest tenth when necessary. Be sure to ask questions if you need more help with a topic.

I CAN USE THE PYTHAGOREAN THEOREM TO FIND UNKNOWN SIDE LENGTHS IN RIGHT TRIANGLES.

1. Find x, the missing side length in the right triangle.



2. Find x, the missing side length in the right triangle.



5. The legs of an isosceles right triangle measure 10 inches. Find the length of the hypotenuse.

I CAN APPLY THE PYTHAGOREAN THEOREM TO REAL-WORLD PROBLEMS.

7. Peter is trying to get his cat out of his backyard. The cat is 12 feet above ground, and Peter sets the base of the ladder 16 feet away from the tree to avoid some bushes. How long does the ladder need to be to reach the cat?

EIGHTH GRADE CURRICULUM

PYTHAGOREAN THEOREM

UNIT NINE: ANSWER KEY

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answer keys
included

