

MANEUVERING THE MIDDLE

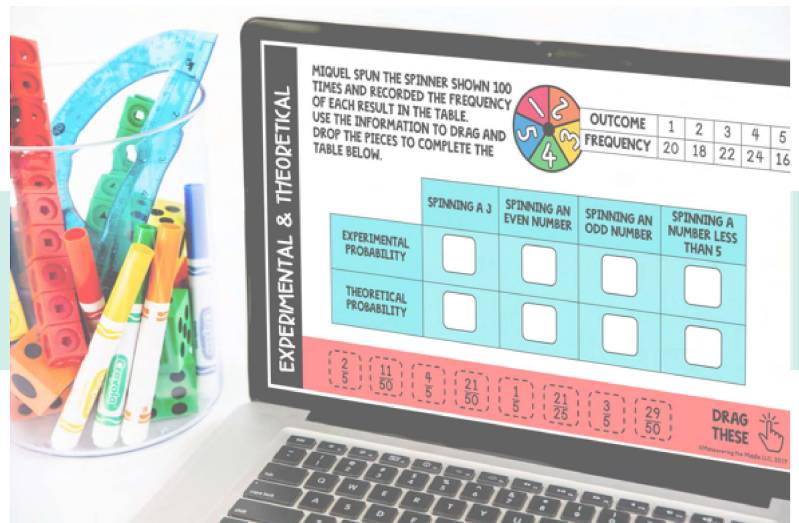
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SCATTER PLOTS

with two variables, or _____ data.

- Scatter plots can help determine if one variable has an effect on the other, or if there are overall trends, patterns or _____ between

Zara surveyed 100 shoppers and recorded the amount of money they spent on purchases. The data is shown in the table below.

a. How many shoppers did Zara survey?

b. Does the number of items purchased seem to have an effect on the amount of money a shopper spent? Explain.



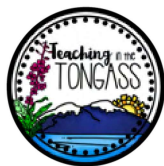
Use the data below to determine the possible types of association seen in scatter plots.

POSITIVE ASSOCIATION NEGATIVE ASSOCIATION NO ASSOCIATION

DAY	TOP
DAY 1	Scatter Plots and Association
DAY 2	Scatter Plots and Association
DAY 3	Scatter Plots and Association
DAY 4	Scatter Plots and Association
DAY 5	Scatter Plots and Association
DAY 6	Scatter Plots and Association
DAY 7	Scatter Plots and Association
DAY 8	Scatter Plots and Association
DAY 9	Scatter Plots and Association
DAY 10	Scatter Plots and Association

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PYTHAGOREAN THEOREM UNIT

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PYTHAGOREAN THEOREM UNIT

PACING GUIDE



DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
The Pythagorean Theorem Student Handout 1 Homework 1	Pythagorean Theorem Converse Student Handout 2 Homework 2	Applying the Pythagorean Theorem Student Handout 3 Homework 3	Pythagorean Theorem Quiz Quiz 1	Distance on a Coordinate Plane Student Handout 4 Homework 4
DAY 6	DAY 7	DAY 8	NOTES	
3D Applications of Pythagorean Theorem Student Handout 5 Homework 5	Pythagorean Theorem Study Guide Review	Pythagorean Theorem Unit Test Test		

PYTHAGOREAN THEOREM



Student Handouts

This file has been organized for double-sided printing. Blank pages are left intentionally.

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.

Included in this unit you will find the following:

Unit Overview

a sample pacing calendar, ideas and tips for teaching/introducing the concepts, unit vocabulary, big ideas, vertical alignment, and common misconceptions

Student Handouts

student-friendly notes and practice problems, homework/independent practice, quizzes, unit review, and unit assessment

Student Handouts as Google Slides

a Google Slide version of the unit (excluding assessments)

Answer Keys

an answer key for each page of the unit

Editable Unit Assessment

a PPT file of the unit test has been provided for you to make modifications

Need to get in touch? Please direct all questions to contact@maneuveringthemiddle.com.

HELPFUL HINTS

Organization and Teaching Tips

Maneuvering the Middle® has been publishing teaching strategies, classroom tools and organization tips since 2013. Click the buttons below to access some of our favorite tips and tricks for the classroom.

MATH CONCEPTS

Getting Started with
Algebra Tiles

How to Model
Integer Operations

Ideas for Teaching
Proportional Relationships

How to Teach Slope
Across Grade Levels

TEACHER ORGANIZATION

Utilizing Google Drive and
Google Classroom Effectively

Teacher
Organization Hacks

Must Have
Teacher Supplies

Our Favorite
Technology Gadgets

INSTRUCTIONAL IDEAS

Ideas for Implementing
Math Small Groups

Test Corrections as a
Tool for Mastery

Turn Any Worksheet
into an Activity

Out of the Box Ideas for
Using Task Cards

EIGHTH GRADE CURRICULUM

PYTHAGOREAN THEOREM

UNIT NINE: 8.G.6, 8.G.7, 8.G.8

PYTHAGOREAN THEOREM

EIGHTH GRADE CURRICULUM
UNIT NINE: 8.G.6, 8.G.7, 8.G.8

PYTHAGOREAN THEOREM

EIGHTH GRADE CURRICULUM
UNIT NINE: 8.G.6, 8.G.7, 8.G.8

PYTHAGOREAN THEOREM

EIGHTH GRADE CURRICULUM
UNIT NINE: 8.G.6, 8.G.7, 8.G.8

EIGHTH GRADE CURRICULUM

PYTHAGOREAN THEOREM

UNIT NINE: ANSWER KEY

EIGHTH GRADE CURRICULUM

PYTHAGOREAN THEOREM

UNIT NINE: ACTIVITIES

EIGHTH GRADE CURRICULUM

PYTHAGOREAN THEOREM

UNIT NINE: ASSESSMENTS

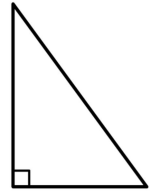
THE PYTHAGOREAN THEOREM

PARTS OF A RIGHT TRIANGLE

• In a right triangle, the two sides adjacent to the right angle are known as the _____, or _____ and _____.

• The side opposite from the right angle is called the _____, or _____.

• The hypotenuse is always the _____ side of a right triangle.



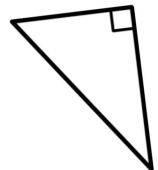
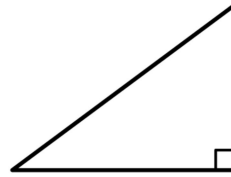
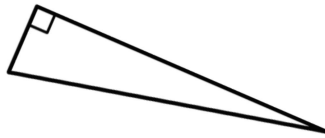
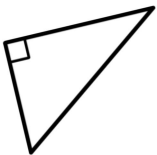
PYTHAGOREAN THEOREM

• The Pythagorean theorem tells us how the _____ lengths of _____ triangles are related.

• In any right triangle, the _____ of the hypotenuse is equal to the sum of the _____ of the other two sides. This relationship can be represented by the equation:

$$\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

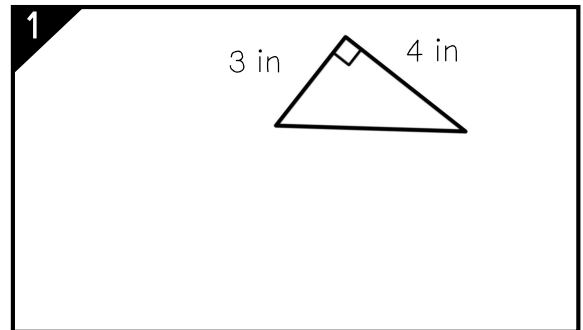
Label a, b and c on each of the right triangles below.



Use the steps below to find the missing side length of the right triangle in example 1.

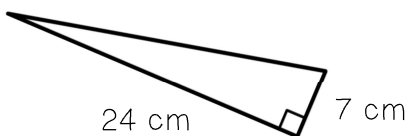
FINDING SIDE LENGTHS OF RIGHT TRIANGLES

- Label _____, _____ and _____.
- Substitute the known values into the _____ theorem.
- _____ for the missing variable.

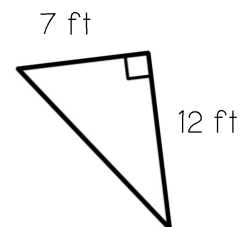


Find the missing side length of each right triangle. Round to the nearest tenth if necessary.

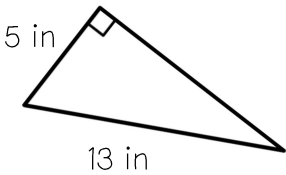
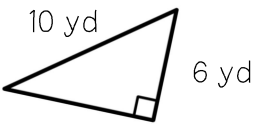
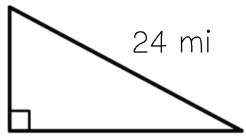
2.



3.



Use the Pythagorean theorem to find the missing side length in each right triangle. Round to the nearest tenth if necessary.

<p>4.</p> 	<p>5.</p> 	<p>6.</p> 
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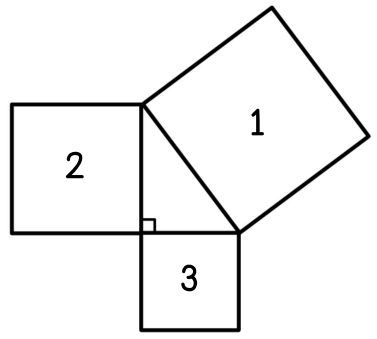
Apply the Pythagorean theorem to answer 7-10. Round to the nearest tenth when necessary.

<p>7. A rectangular pool at Andy's gym measures 25 meters by 50 meters. How many meters would Andy need to swim in order to swim diagonally across the pool?</p>	<p>8. A pole vaulter rests a 17-foot pole against a wall. If the top of the pole hits the wall 14 feet above the ground, how far from the wall is the bottom of the pole?</p>
--	---

9. Use the diagram at the right to answer a and b.

a. If the area of square 2 is 64 units² and the area of square 3 is 36 units², find the area and the side length of square 1.

b. If the area of square 1 is 25 units², and the area of square 2 is 16 units², what is the perimeter of square 3?



10. The squares below form a model of the Pythagorean theorem. Malachi has solved and found the area of the center square to be 527 square units. Describe his error and find the correct answer.

P =
28 in

A = ?

P =
96 in

MALACHI

$$7^2 + b^2 = 24^2$$

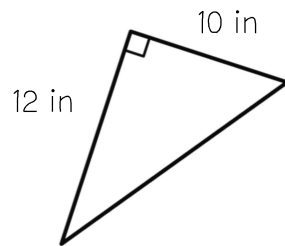
$$49 + b^2 = 576$$

$$b^2 = 527 \text{ in}^2$$

THE PYTHAGOREAN THEOREM

Use the Pythagorean theorem to help you solve the questions below.

1. Which equation could be used to find the missing side length of the right triangle shown?



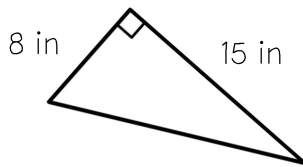
- A. $12^2 - 10^2 = c^2$
- B. $12^2 + b^2 = 10^2$
- C. $12(2) + 10(2) = c(2)$
- D. $12^2 + 10^2 = c^2$

2. Which of the following statements is not a true statement?

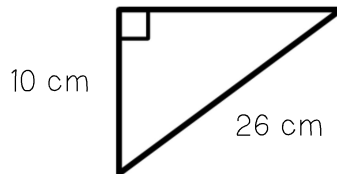
- A. The legs of a triangle are the sides adjacent to the right angle.
- B. The hypotenuse is directly across from the right angle.
- C. The Pythagorean theorem can only be used with right triangles.
- D. The hypotenuse is always the shortest side length.

In 3-8, find the missing side length of each right triangle. Round to the nearest tenth if needed.

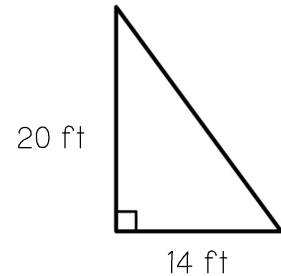
3.



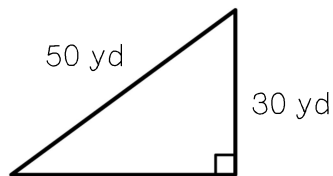
4.



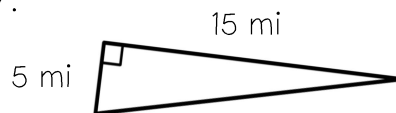
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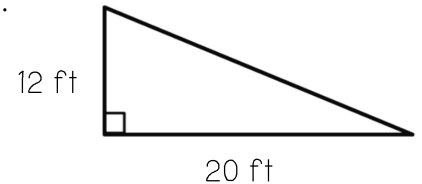
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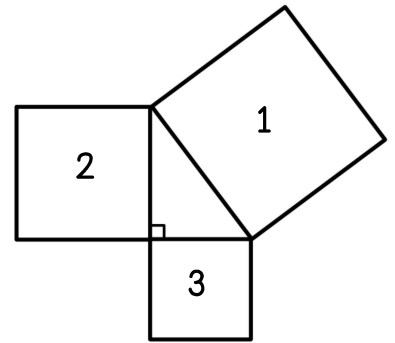
7.



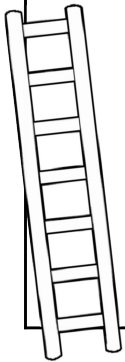
8.



9. If the area of square 1 is 250 units^2 and the area of square 3 is 120 units^2 , what is the area of square 2? Explain your reasoning.



10. Denise is using a ladder to clean the outside of her second story windows. The ladder she is using is 24 feet long, and she puts the base of the ladder 13 feet away from the house in order to avoid her flower garden. How high up the side of her house does the ladder reach? Round to the nearest tenth if necessary.



11. Will ran the diagonal distance across a square field measuring 40 yards on each side. James ran the diagonal distance across a rectangular field with a length of 25 yards and a width of 35 yards. Who ran a longer distance, and how much longer did he run? Show work to justify your answer.

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

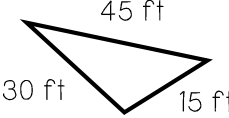
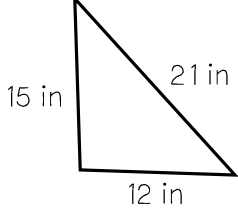
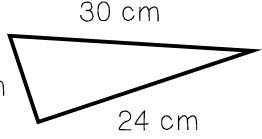
If a triangle has three equal sides,
then it is an equilateral triangle.

CONVERSE

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.

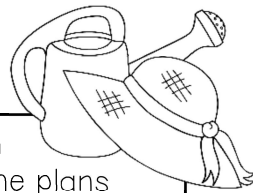
In 1-3, use the Pythagorean converse to prove whether the given triangle is a right triangle. Show all work in the first column. Then, write “yes” or “no” and justify your choice in the last column.

	WORK	RIGHT TRIANGLE? JUSTIFY.
1 		
2 		
3 		

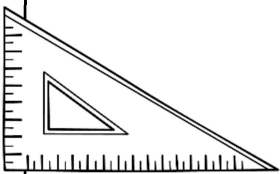
4. Determine if the following side lengths could form a right triangle. Justify your choice.

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 you answer questions 5-7.



<p>5. Jimmy thinks a window frame in his house looks slanted because the corner doesn't 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 36 inches, and the diagonal distance to be 45 inches. Who is correct?</p>	<p>6. Patty wants a triangular garden in her backyard to grow vegetables. She plans to use three pieces of edging that measure 7 feet, 10 feet and 8 feet. Will her garden be in the shape of a right triangle? Why or why not?</p>
--	---



7. The perimeters of three squares are shown below. Could the three squares be positioned so that they meet to form a right triangle? Why or why not?

P=
48 ft

P=
140 ft

P=
148 ft

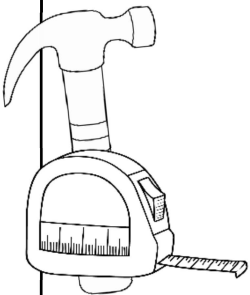
Summarize today's lesson:

PYTHAGOREAN THEOREM CONVERSE

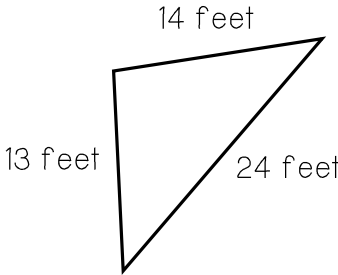
In questions 1-6, write “yes” or “no” to state whether the given side lengths would form a right triangle. Show work to support your answers.

<p>1. 28, 53, 45</p> <p>_____</p>	<p>2. 4.5, 6, 7.5</p> <p>_____</p>	<p>3. 20, 40, 30</p> <p>_____</p>
<p>4. 50, 48, 14</p> <p>_____</p>	<p>5. 1, 2, 5</p> <p>_____</p>	<p>6. 25, 16, 12</p> <p>_____</p>

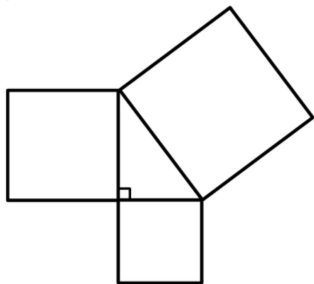
7. Tina built a triangular sign with side lengths of 73 inches, 55 inches and 4 feet. Is the sign a right triangle? Why or why not?



8. Is the triangle shown a right triangle? How do you know?

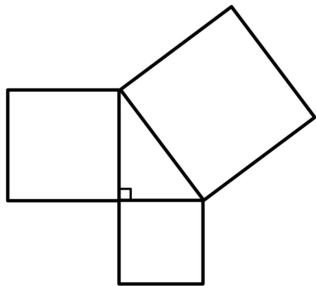


9. Which of the following could be the areas of the three squares below?



- 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

10. Which of the following could be the perimeters of the three squares below?



- A. 12 ft, 16 ft and 20 ft
- B. 20 ft, 16 ft and 24 ft
- C. Both A and B
- D. Neither A nor B

APPLYING THE PYTHAGOREAN THEOREM

The Pythagorean theorem can be applied to many real-world situations. Use and apply your knowledge of the Pythagorean theorem to solve each of the problems below.

1. Bethany has a circular tabletop that she needs to carry inside her house. Her rectangular front door has a width of 36 inches and a height of 80 inches. If the tabletop has a diameter of 86 inches, will it fit through her front door?

I KNOW:

I NEED TO KNOW:

PLAN AND WORK:

SOLUTION:

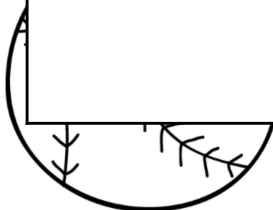
2. Greg plays baseball at a field where the baseball diamond is a square with each side of the square measuring 90 feet. If the baseball was thrown from home plate to 2nd base, and then from 2nd base to 3rd, how many feet did the baseball travel? Round to the nearest tenth.

I KNOW:

I NEED TO KNOW:

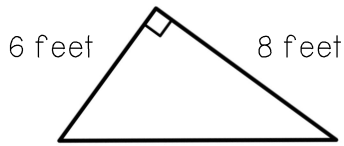
PLAN AND WORK:

SOLUTION:

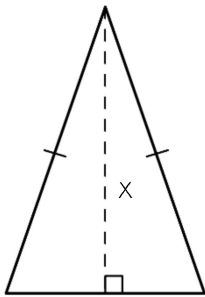


Answer the following questions and round to the nearest tenth when necessary.

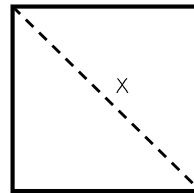
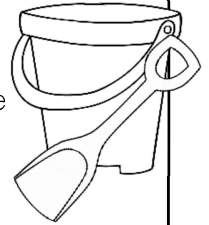
3. Melissa wants to put a ribbon border around a sign in her classroom shaped like the right triangle below. If ribbon costs \$0.82 per foot, how much will it cost her to buy the ribbon for her sign?



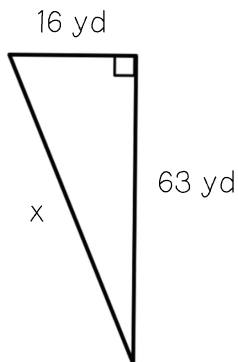
4. In the isosceles triangle below, the congruent sides each measure 13 meters. If the base of the triangle is 10 meters, find x , the height of the triangle.



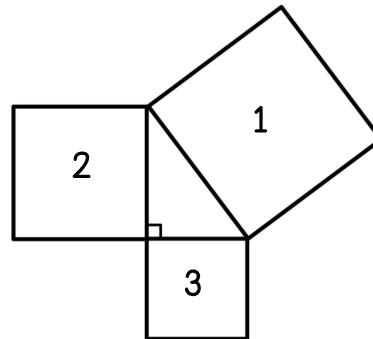
5. A square sandbox in Trisha's backyard has an area of 81 square feet. Find x , the diagonal length of the sandbox.



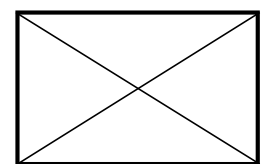
6. To travel to her friend's house, Julie normally walks 63 yards north and 16 yards west as shown. How many yards shorter would it be if Julie took the diagonal shortcut, x ?



7. If the perimeter of square 3 is 36 units and the perimeter of square 2 is 48 units, what is the area of square 1?



8. Lincoln is building a wooden garage door in the shape of a rectangle with a width of 16 feet and a height of 8 feet. Lincoln is going to place two boards in the shape of an "X" on the door. How many feet of material will he need for the "X"?

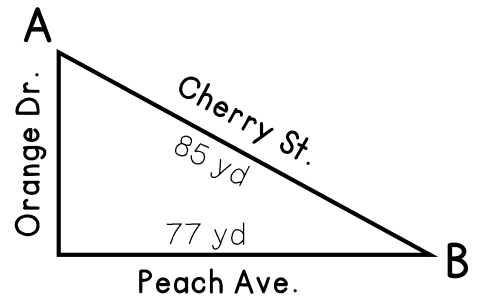


Summarize today's lesson:

APPLYING THE PYTHAGOREAN THEOREM

Use the Pythagorean theorem to help you answer the following questions. Show all work and round to the nearest tenth when necessary.

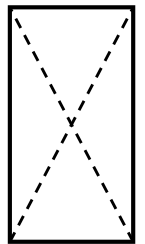
1. Layne rode his bike from Point A to B by using Cherry Street. How much further would his trip have been if he took Orange Drive and Peach Avenue instead?



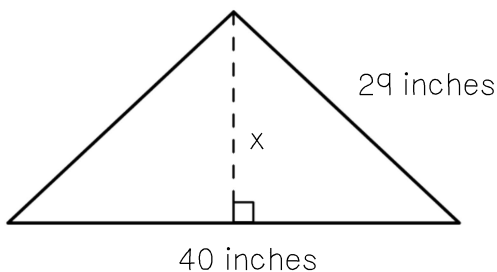
2. Ashton left his house and ran 4 miles east and then 3 miles north. He then took the diagonal path back home. If he burned 105 calories every mile that he ran, how many total calories did he burn on his run?

3. The Blackburn family has a square field where they keep their cattle. The area of the field is 40,000 ft², and Mr. Blackburn wants to put a fence diagonally through the field. What should the length of the fence be?

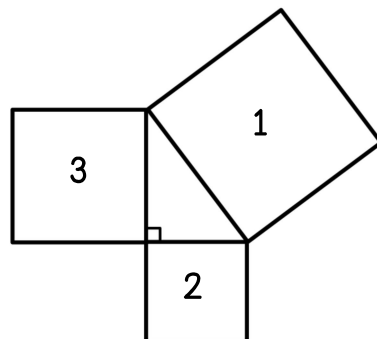
4. Martin needs to place caution tape across both diagonals of a broken rectangular door in his store. If the dimensions of the door are 3 feet by 7 feet, how many feet of caution tape will he need?



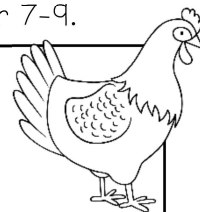
5. Tony is building a doghouse, and the front view of the roof is an isosceles triangle as shown below. What is the height of the roof?



6. If the area of square 2 is 225 units², and the perimeter of square 1 is 100 units, what is the area of square 3?



Joel wants to fence off a triangular portion of his yard for his chickens. The three pieces of fencing he has measure 8 feet, 15 feet, and 20 feet long. Use this information to answer 7-9.



7. Will Joel be able to make a right triangle with the current lengths of fencing? Why or why not?

8. Joel cut the longest piece of fencing in order to make a right triangle. Find the perimeter of Joel's fence.

9. If it takes Joel 30 seconds to install each foot of fencing, how many total minutes will it take him to install the fence?

QUIZ: PYTHAGOREAN THEOREM

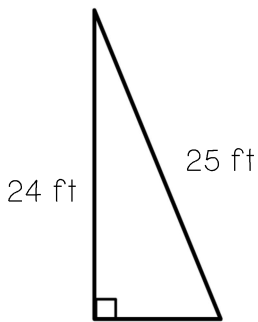
Show all work as you answer each question. Round solutions to the nearest tenth when necessary.

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?

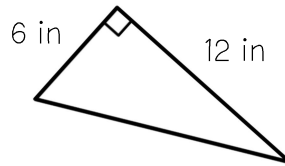
- A. $84^2 - 56^2 = c^2$
B. $(84 + 56)^2 = c^2$

- C. $84^2 + b^2 = 56^2$
D. $84^2 + 56^2 = c^2$

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

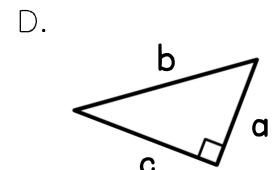
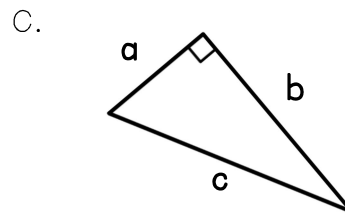
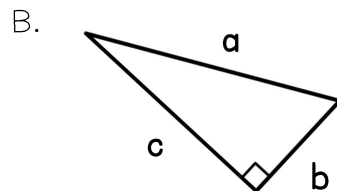
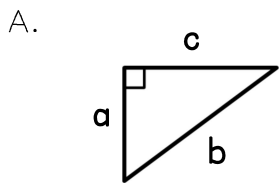


3. Find the missing side length of the right triangle below.



Answers	
1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
7.	_____
8.	_____
9.	_____
10.	_____
11.	_____
12.	_____

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



5. Jack has a 35-foot ladder leaning against the side of his house. If the bottom of the ladder is 21 feet away from his house, how many feet above the ground does the ladder touch the house?

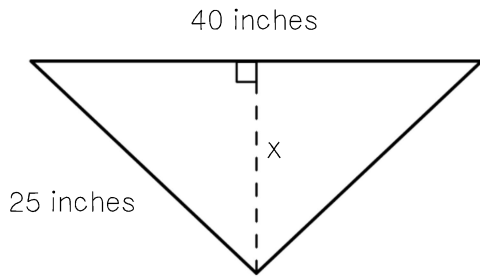
6. Which of the following sets of lengths could be used to form a right triangle?

- A. 39 cm, 15 cm and 36 cm
- B. 12 ft, 8 ft and 4 ft
- C. 13 in, 17 in and 9 in
- D. None of the above

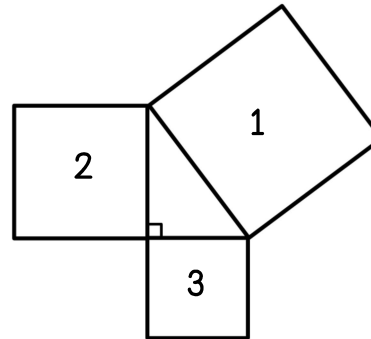
7. Why is it not possible to form a right triangle with the lengths of 2 inches, 4 inches and 7 inches?

- A. Because $4^2 - 2^2 \neq 7^2$
- B. Because $2 + 4 \neq 7$
- C. Because $2^2 + 4^2 \neq 7^2$
- D. Because $2^2 + 7^2 \neq 4^2$

8. Find the value of x in the isosceles triangle.



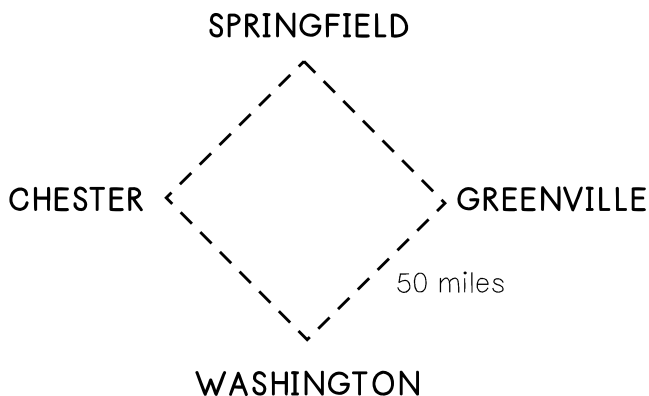
9. In the figure below, the area of square 1 is 169 cm^2 and the perimeter of square 2 is 48 cm. What is the area of square 3?



10. Andrew is using three pieces of scrap wood to build a wall shelf in his bathroom. The shelf will be shaped like a triangle, and the pieces of scrap wood measure 12 inches, 15 inches and 9 inches long. Will the shelf be a right triangle? Why or why not?

11. Clay went for a run to prepare for a long-distance race coming up. From his house, he ran 6 miles directly north and then 8 miles directly west. From there, he ran the diagonal distance back to his house. How many total miles did Clay run?

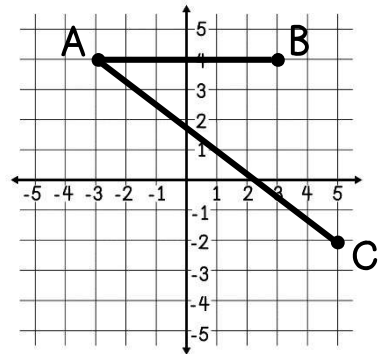
12. The four cities on the map below form a square. About how many miles is the most direct route from Washington to Springfield?



DISTANCE ON A COORDINATE PLANE

Assuming each interval on the graph represents one unit, find each of the following segment lengths by counting. If not possible, explain why.

- Find the length of \overline{AB} .
- Find the length of \overline{AC} .
- Explain how a right triangle could be used to help you answer part b.

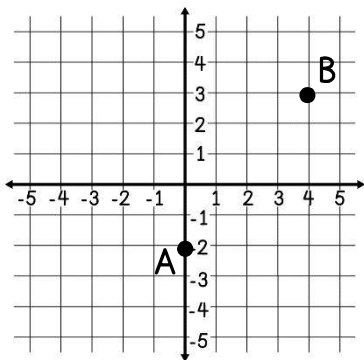


DISTANCE ON A COORDINATE PLANE

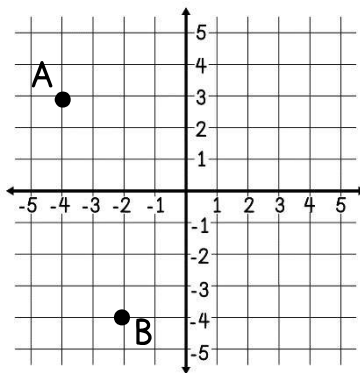
- To find a diagonal distance on a coordinate plane, create a right triangle where the diagonal distance is the _____, or _____.
- Then, use the _____ _____ to calculate the diagonal distance.

In 1-3, use the Pythagorean theorem to find the distance between points A and B on each graph. Round answers to the nearest tenth.

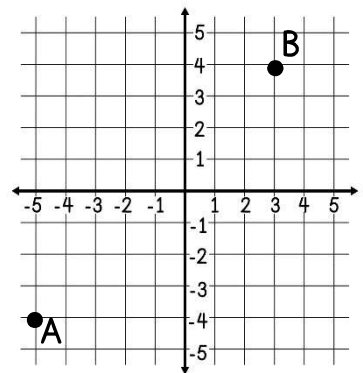
1.



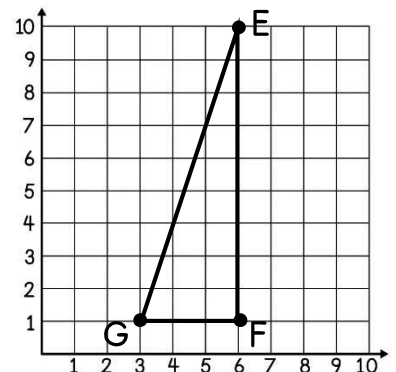
2.



3.



4. Triangle EFG is shown on the grid. Find the length of \overline{EG} .

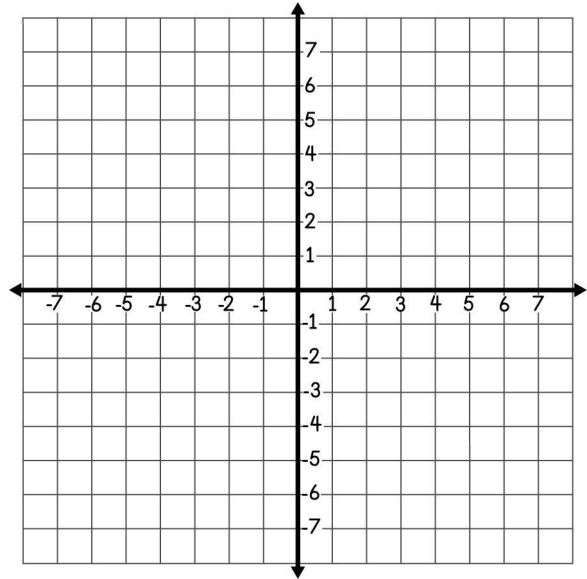


In 5-7, use the graph and the Pythagorean theorem to find the distance between the points.

5. $(-6, 1)$ and $(-4, 5)$

6. $(-7, -7)$ and $(4, -3)$

7. $(0, 2)$ and $(7, 7)$

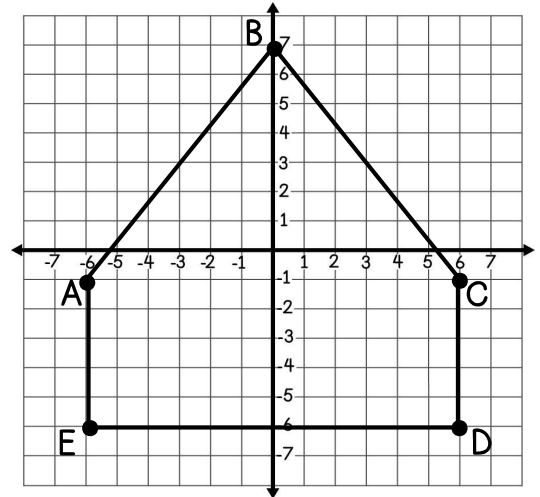


8. The pentagon on the grid represents the front view of a dollhouse in Caylin's toy room. Use the grid to answer a-b.

a. If each unit on the grid represents 1 cm, list the length of each segment below.

\overline{AB} : _____ \overline{BC} : _____ \overline{CD} : _____ \overline{DE} : _____ \overline{EA} : _____

b. Find the perimeter of the pentagon. _____

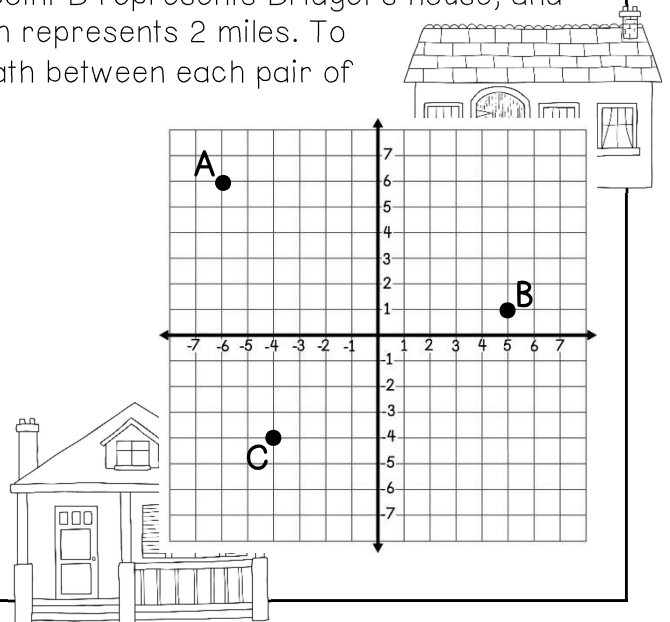


9. In the graph below, point A represents Aria's house, point B represents Bridget's house, and point C represents Capri's house. Each unit on the graph represents 2 miles. To the nearest tenth, find the distance of the most direct path between each pair of houses.

a. Aria and Bridget _____

b. Bridget and Capri _____

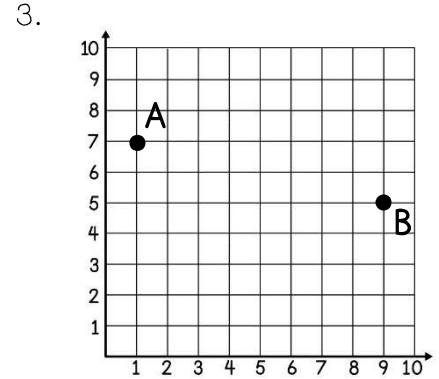
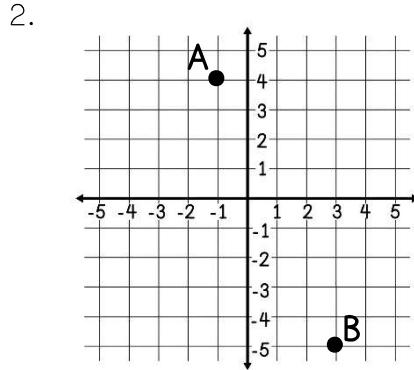
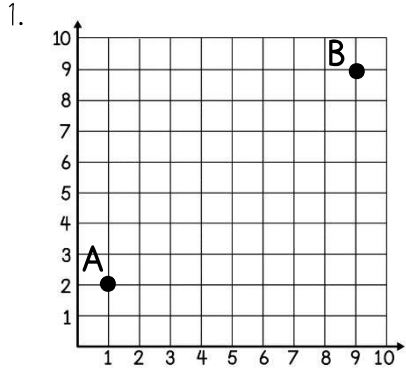
c. Capri and Aria _____



Summarize today's lesson:

DISTANCE ON THE COORDINATE PLANE

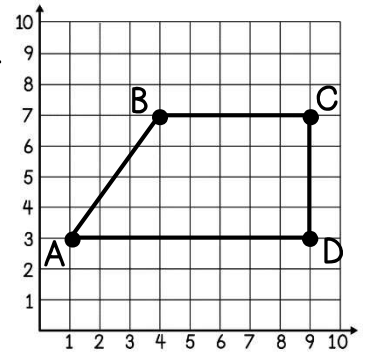
In 1-3, find the diagonal distance between each given pair of points to the nearest tenth.



Use the trapezoid shown to mark each statement below as true or false. If false, rewrite the statement correctly in the space below the statement.

_____ 4. The length of \overline{AB} can be found using $3^2 + b^2 = 4^2$.

_____ 5. The perimeter of the trapezoid shown is 22 units.

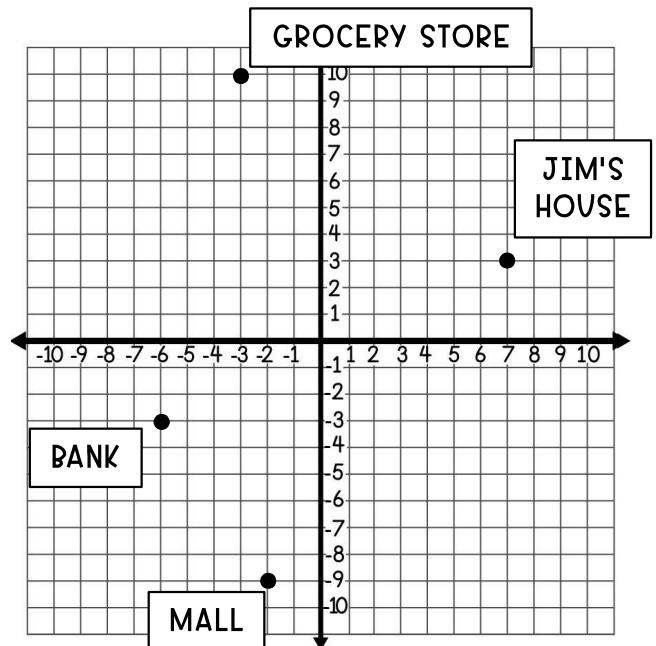


The graph below represents a map where each unit is 0.75 miles. Use the map to answer 6-8.

6. How many miles is the most direct path from Jim's house to the mall?

7. Jim's car has 25 miles until it runs out of gas. Would Jim be able to make it from his house to the grocery store and back without stopping for gas? Explain.

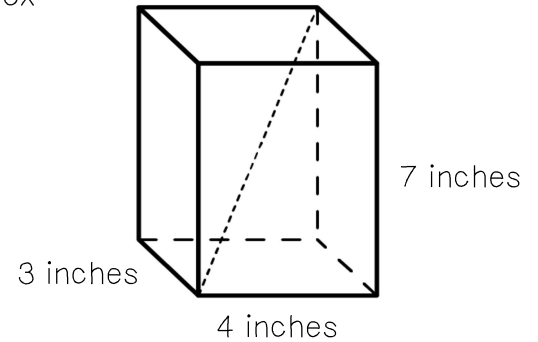
8. Jim hopes a park will be built within 5 miles of his house. If a park is built at the coordinates (3, 7), does that meet Jim's criteria? Explain.



3D APPLICATIONS OF PYTHAGOREAN THEOREM

Lindsay wants to mail a candle that is 8 inches tall to a friend for her birthday and needs to know if the candle will fit diagonally in a box with the dimensions shown.

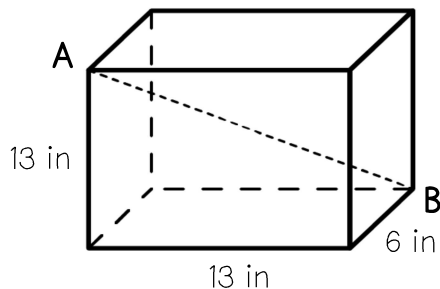
a. Describe how the Pythagorean theorem could help Lindsay answer her question.



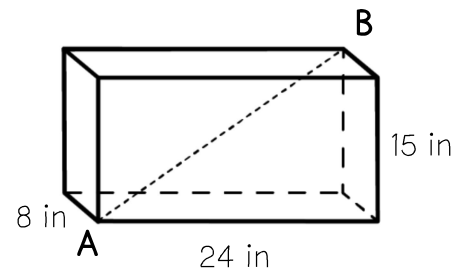
b. Is the box big enough to fit the candle? Explain.

Use the Pythagorean theorem to answer 1-3, rounding solutions to the nearest tenth.

1. Find the length of \overline{AB} .



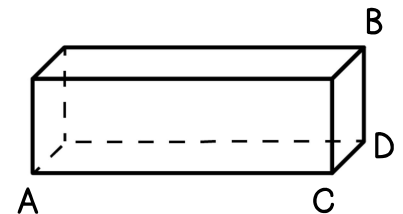
2. Find the length of \overline{AB} .



3. In the prism shown, \overline{AC} is 12 cm, \overline{CD} is 5 cm and \overline{BD} is 2 cm. Mark each statement as true or false. If false, rewrite the statement correctly.

_____ a. The length of \overline{AD} is the square root of the sum of 12^2 and 2^2 .

_____ b. The length of \overline{AB} is equal to the length of \overline{AD} .

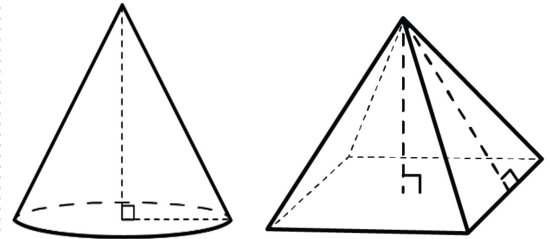


When right angles are present in figures, the Pythagorean theorem can often be used to solve for missing lengths. Review the relevant parts of pyramids and cones in the box below.

PARTS OF PYRAMIDS AND CONES

- The height of a pyramid or cone will always be perpendicular to the base, meaning it intersects the base at a _____ angle.
- In a pyramid, the slant height is the lateral distance from the vertex of the cone or pyramid to the base and will also intersect the edge of the base at a _____ angle.

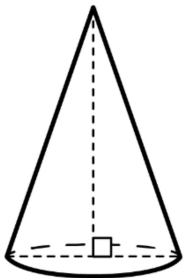
Label h , the height, and s , the slant height of each figure.



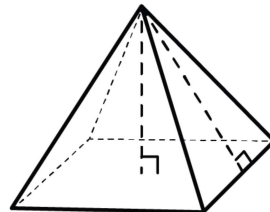
- Label r , the radius of the cone above. What do you notice?
- Connect the height and the slant height of the pyramid above along the base. What do you notice?

Use the Pythagorean theorem to help you find the missing measurements in each problem. Round all solutions to the nearest tenth when necessary.

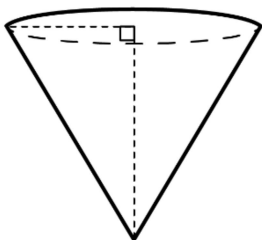
4. The radius of the cone is 14 centimeters, and the slant height is 28 centimeters. Find the height of the cone.



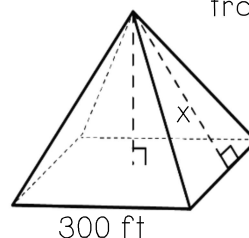
5. The base of the pyramid is a square with side lengths of 30 inches. The height of the pyramid is 50 inches. Find the slant height.



6. The diameter of the cone is 40 feet, and the height is 21 feet. Find the slant height.



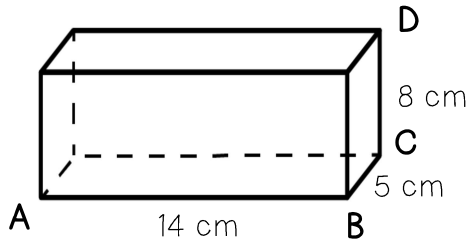
7. A window washer is repelling and cleaning the windows of a hotel shaped like the square pyramid shown. The height of the pyramid is 200 feet. If the window washer travels to the top of the pyramid and back down along the straight path, x , how many total feet has he traveled?



3D APPLICATIONS OF PYTHAGOREAN THEOREM

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

Use the rectangular prism shown to answer 1-2.

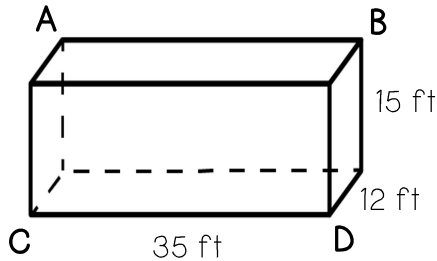


1. Find the length of \overline{AC} . _____

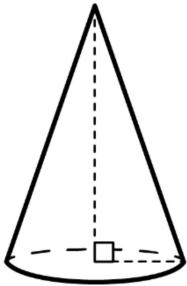
2. Find the length of \overline{AD} . _____

3. A room in a bank is shaped like the rectangular prism shown below. The room has a security system that is triggered by two laser beams which stretch from point A to D and point B to C.

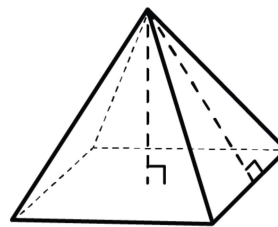
How many total feet of laser beams are there?



4. If the radius of the cone is 5 inches and the height of the cone is 18 inches, what is the slant height of the cone?



5. The square base of the pyramid has an area of 144 square feet. If the slant height of the pyramid is 10 feet, what is the height of the pyramid?



6. An Egyptian pyramid has a square base that measures 80 meters on each side. If the height of the pyramid is 30 meters, what is the slant height of the pyramid?



7. Kathleen's ice cream cone has a diameter of 9 cm and a slant height of 7.5 cm. What is the height of the ice cream cone?

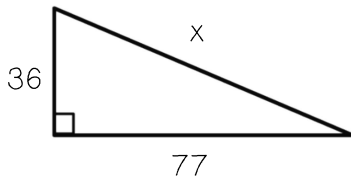


PYTHAGOREAN THEOREM STUDY GUIDE

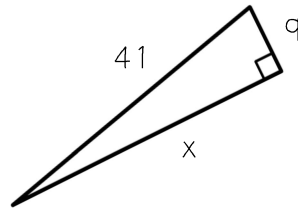
Solve each of the problems below, and round all solutions to the nearest tenth when necessary. Be sure to ask questions if you need more help with a topic.

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

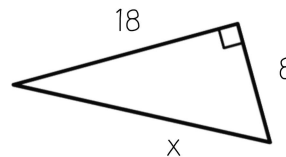
1. Find x , the missing side length in the right triangle.



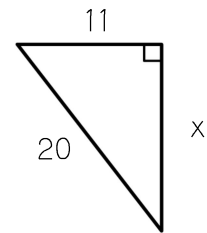
2. Find x , the missing side length in the right triangle.



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



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



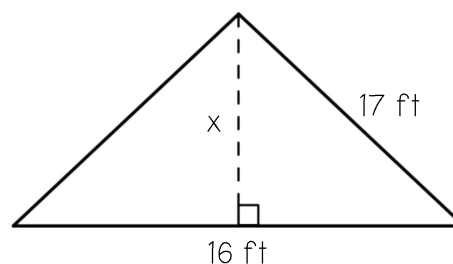
5. The legs of an isosceles right triangle each measure 10 inches. Find the length of the hypotenuse.

6. The longest side in a right triangle is 24 cm, and the second longest side is 20 cm. Find the length of the shortest side.

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

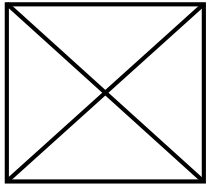
7. Peter is trying to get his cat out of a tree in his backyard. The cat is 12 feet above the ground, and Peter sets the base of his ladder 9 feet away from the tree to avoid some mud. How long does the ladder need to be in order to reach the cat?

8. The front view of a tent is shaped like an isosceles triangle as shown below. If a zipper is going to be put in along the length of x , how long should the zipper be?

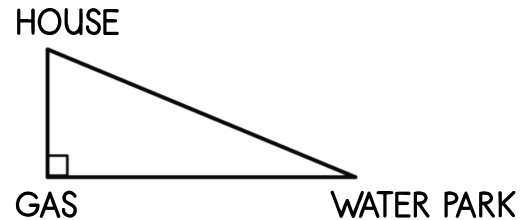


I CAN APPLY THE PYTHAGOREAN THEOREM TO SOLVE REAL-WORLD PROBLEMS.

9. Kevin is creating a target for a game that will be played at the school's carnival and needs to put red tape in the shape of an "x" as shown below. If the area of the square board is 25 square feet, how many feet of tape will he need?

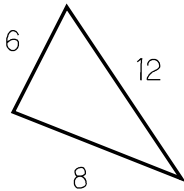


10. Gigi's family left their house and drove 14 miles south to a gas station and 48 miles east to a water park. How much shorter would their trip to the water park have been if they hadn't stopped at the gas station and driven along the diagonal path instead?

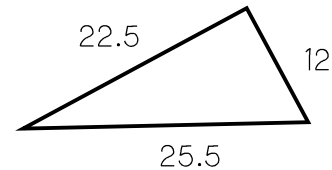


I CAN EXPLAIN AND USE THE PYTHAGOREAN THEOREM CONVERSE.

11. Is the triangle a right triangle? Explain.



12. Is the triangle a right triangle? Explain.



13. Could the side lengths below form a right triangle? Explain.

61, 60, 11

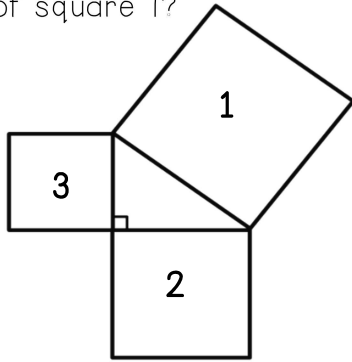
14. Could the side lengths below form a right triangle? Explain.

5, 7.5, 2.5

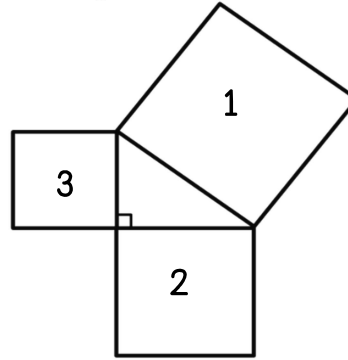
15. The triangular sail on Esther's sailboat measures 10.5 feet, 14 feet and 17.5 feet on its three sides. Is the sail a right triangle? Explain.

I CAN EXPLAIN A PROOF OF THE PYTHAGOREAN THEOREM.

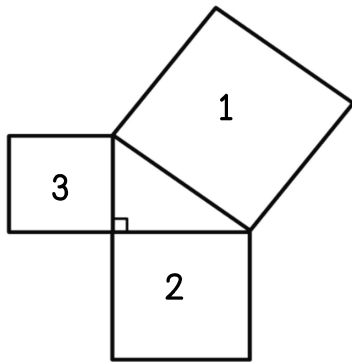
16. If the area of square 3 is 80 cm^2 and the area of square 2 is 100 cm^2 , what is the area of square 1?



17. If the perimeter of square 1 is 104 ft and the area of square 2 is 576 ft^2 , what is the side length of square 3?



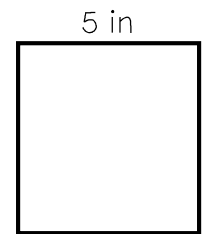
18. Marvin is painting three squares shaped like the figure below. If it takes him exactly four cans of paint to paint square 3 and five cans of paint to paint square 2, how many cans of paint should he need to paint square 1?



19. Could the three squares below join to form a right triangle? Why or why not?

Area:
 9 in^2

Perimeter:
16 in

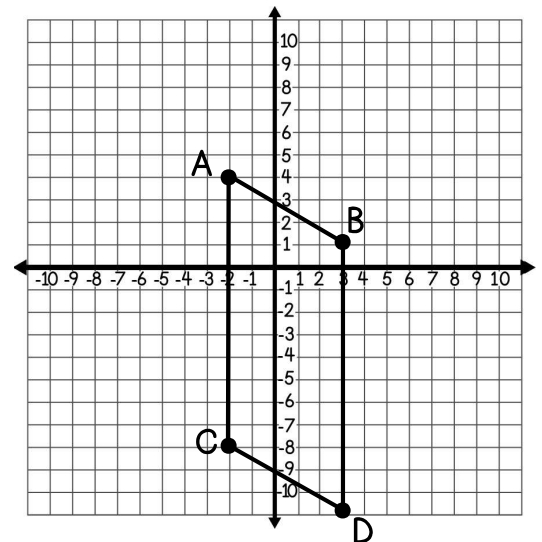


I CAN APPLY THE PYTHAGOREAN THEOREM TO FIND DISTANCE ON A COORDINATE PLANE.

20. To the nearest tenth, what is the length of line segment CD on the parallelogram?

21. What is the perimeter of the parallelogram?

22. How many units is it from point B to point C?

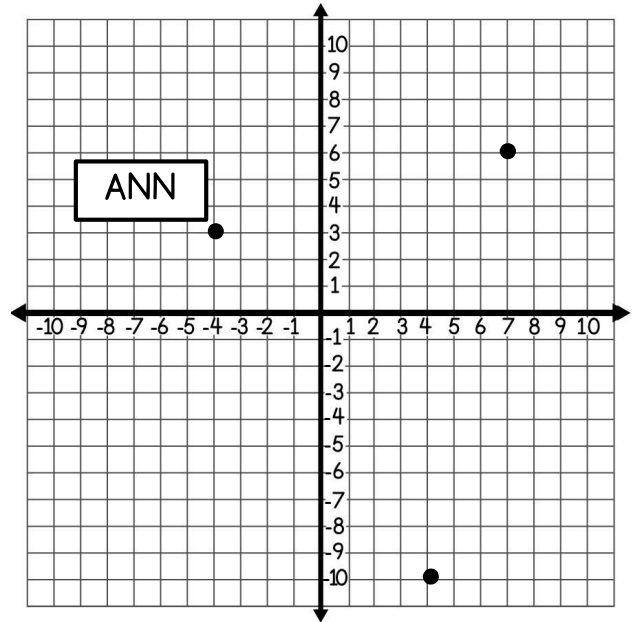


I CAN APPLY THE PYTHAGOREAN THEOREM TO FIND DISTANCE ON A COORDINATE PLANE.

The point on the graph represents Ann's location. She is using a metal detector on the beach to see what she can find. Each unit on the graph represents 2 feet.

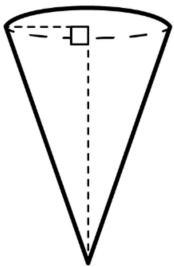
23. A piece of jewelry is located at $(7, 6)$. Find the length of the most direct path between Ann and the jewelry.

24. A pile of bottle caps is located at $(4, -10)$. Find the length of the most direct path between Ann and the pile of bottle caps.

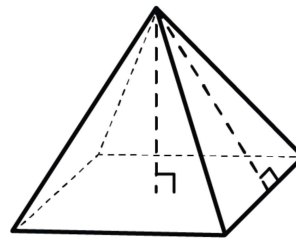


I CAN APPLY THE PYTHAGOREAN THEOREM TO FIND UNKNOWN LENGTHS IN THREE DIMENSIONS.

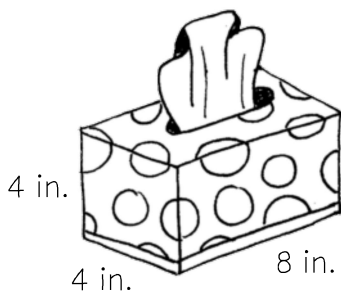
25. The cone below has a base with a diameter of 12 inches and a height of 8 inches. What is the slant height of the cone?



26. The square pyramid has a base with an area of 64 cm^2 and a slant height of 9 cm. What is the height of the pyramid?



27. Stuart wants to play a trick on his friend by hiding his pencil in the box of tissues shown below. If his friend's pencil is 9 inches in length, will it fit diagonally in the box of tissues? Explain.



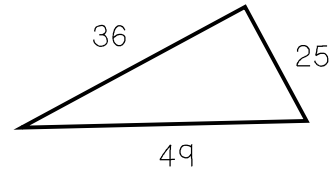
PYTHAGOREAN THEOREM UNIT TEST

Solve the problems below. Round all answers to the nearest tenth when necessary.

1. Which of the following is not a true statement about the sides of a right triangle?

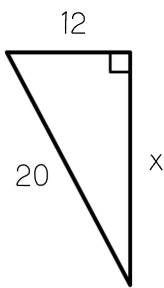
- A. The hypotenuse is the longest side.
- B. The legs are the sides adjacent to the 90° angle.
- C. Side "a" is always longer than side "b."
- D. The hypotenuse is opposite the 90° angle.

2. Raquiem needs to know if the triangle shown is a right triangle. Which equation could he use to help?



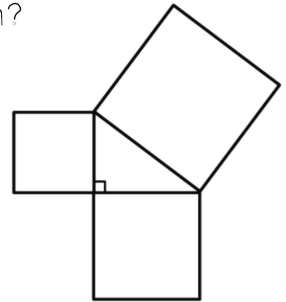
- A. $\sqrt{36} + \sqrt{25} = \sqrt{49}$
- B. $25 + 36 = 49$
- C. $25^2 + 36^2 = 49^2$
- D. $36^2 - 25^2 = 49^2$

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

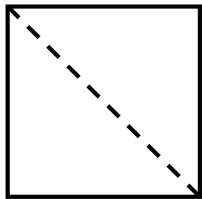


4. Which of the following could be the areas of the three squares shown?

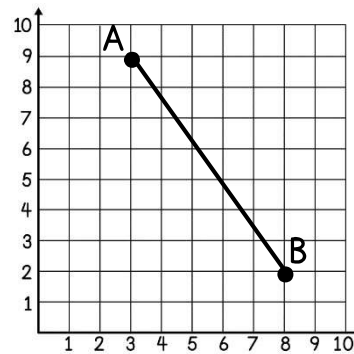
- A. 40 ft^2 , 55 ft^2 , 95 ft^2
- B. 35 ft^2 , 25 ft^2 , 45 ft^2
- C. 10 ft^2 , 10 ft^2 , 100 ft^2
- D. 40 ft^2 , 30 ft^2 , 1200 ft^2



5. Marcy's breakfast table has a square top with an area of 36 square feet. What is the diagonal length of the tabletop?

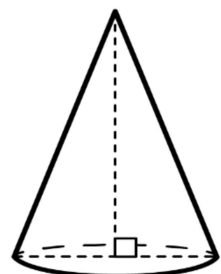


6. Find the length of \overline{AB} .



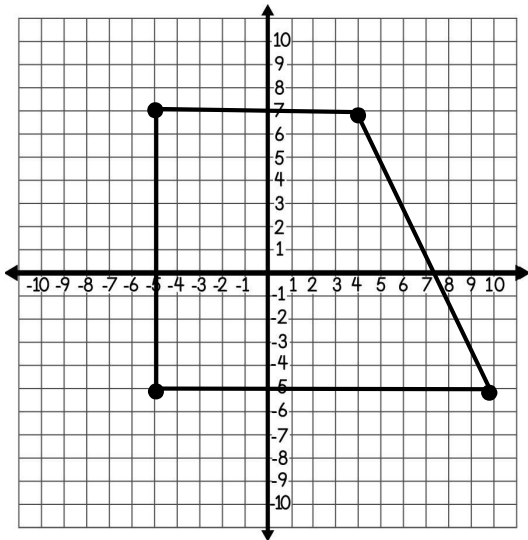
7. A cone-shaped play tent has a radius of 4 feet and a slant height of 7 feet. If Joe is six feet tall, which of the following statements is true?

- A. Joe is shorter than the tent.
- B. Joe is taller than the tent.
- C. Joe is the same height as the tent.
- D. There is not enough information to determine if Joe is shorter or taller than the tent.

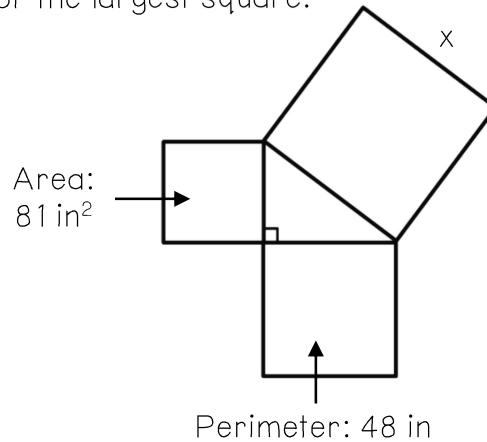


Solve the problems below. Round all answers to the nearest tenth when necessary.

8. Find the perimeter of the trapezoid.



9. The three squares below join to form a right triangle. The area and the perimeter for two of the squares are shown. Find x , the side length of the largest square.

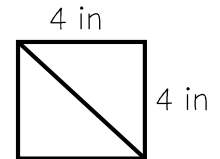


10. Which of the following could NOT be the side lengths of a right triangle?

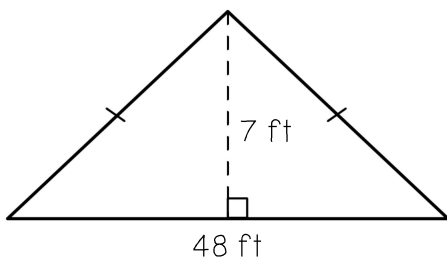
- A. 7.5, 10 and 12.5
- B. 85, 13 and 84
- C. 37, 35 and 12
- D. 24, 22 and 40

11. Briana's backsplash in her kitchen is made up of square tiles like the one below. The tiles are white with a black diagonal stripe. Which of the following would help her find x , the length of the black stripe?

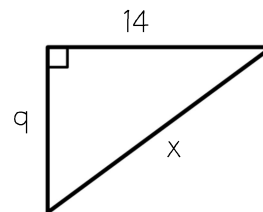
- A. $4 + 4 = x$
- B. $4^2 + 4^2 = x$
- C. $4^2 + 4^2 = x^2$
- D. $\sqrt{4} + \sqrt{4} = x$



12. Find the perimeter of the isosceles triangle.

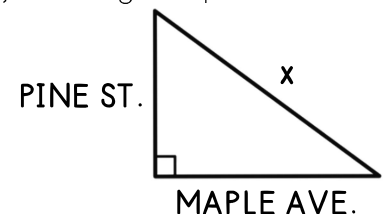


13. Find x , the missing side length of the right triangle.



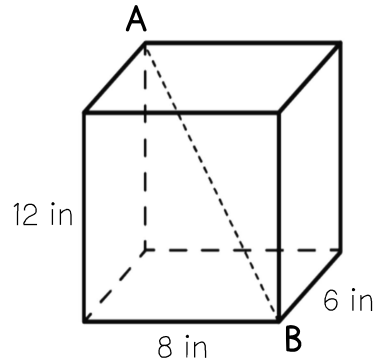
14. Quinton typically walks 28 yards south on Pine Street and 45 yards east on Maple Avenue to get to school. How much shorter would his walk be if he walked along x , the diagonal path below?

- A. 73 yards
- B. 20 yards
- C. 53 yards
- D. 126 yards



Solve the problems below. Round all answers to the nearest tenth when necessary.

15. Which of the following is closest to the diagonal length between A and B?

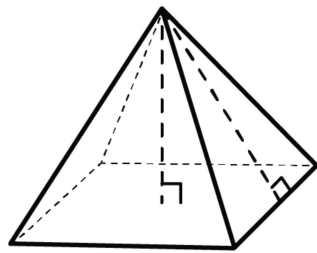


- A. 15.6 inches
- B. 10 inches
- C. 244 inches
- D. 22 inches

16. Paul is building a bridge for a school project and wants to make a right triangle out of three popsicle sticks that measure 8 cm, 10 cm and 18 cm. Can he make a right triangle out of these lengths?

- A. Yes, because $8 + 10 = 18$.
- B. Yes, because $8^2 + 10^2 = 18^2$.
- C. No, because $8(2) + 10(2) \neq 18(2)$.
- D. No, because $8^2 + 10^2 \neq 18^2$.

17. A pyramid has a square base with sides that measure 10 cm and a height of 14 cm. What is the slant height of the pyramid?



- A. 17.2 cm
- B. 14.9 cm
- C. 13.2 cm
- D. 12.1 cm

18. In a football drill, Ron stands 30 yards directly east of John, and Bill stands 40 yards directly north of John. If the football is thrown from Ron to Bill and then from Bill to John, how many yards will the football travel?

In the graph below, point A represents Owen's house, point B represents David's house and point C represents the school. Each unit on the graph represents 1.5 miles. Use the graph to answer questions 19 and 20.

19. How many miles does Owen live from the school?

20. Who lives closer to the school, and by how many miles?

