PYTHAGOREAN THEOREM NOTES

GUIDED NOTES
GRADES 8-9


My name _____ Date _____

Worked Example 1

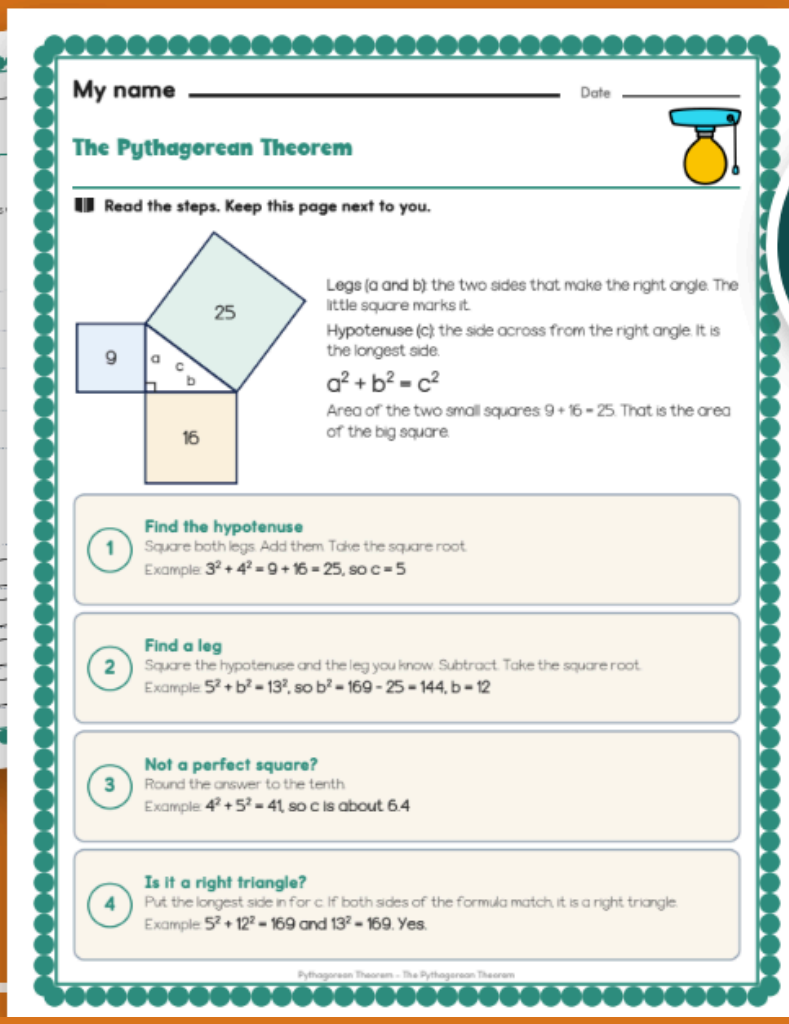
Read the example. Then fill in the blanks.

Example. The legs are 6 and 8. Find the hypotenuse. The numbers make up for practice.

Start	$a^2 + b^2 = c^2$ Start with the formula.
Step 1	$6^2 + 8^2 = c^2$ Put in the two legs. The hypotenuse is c.
Step 2	$36 + 64 = 100 = c^2$ Square each leg. Add them.
Step 3	$c = 10$ Take the square root.
Check	$6^2 + 8^2 = 100$ and $10^2 = 100$. They match. Check. Put c back in.

Your turn. The legs are 12 and 16. Do the same steps.

Start	Start with the formula.
Step 1	Put in the two legs. The hypotenuse is c.
Step 2	Square each leg. Add them.
Step 3	Take the square root.
Check	Check. Put c back in.


My name _____ Date _____

The Pythagorean Theorem

Read the steps. Keep this page next to you.

Legs (a and b): the two sides that make the right angle. The little square marks it.

Hypotenuse (c): the side across from the right angle. It is the longest side.

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

Area of the two small squares 9 + 16 = 25. That is the area of the big square.

1 Find the hypotenuse
Square both legs. Add them. Take the square root.
Example: $3^2 + 4^2 = 9 + 16 = 25$, so $c = 5$

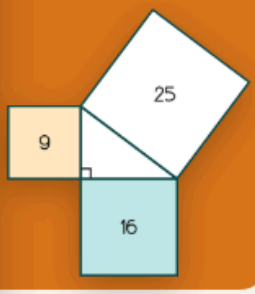
2 Find a leg
Square the hypotenuse and the leg you know. Subtract. Take the square root.
Example: $5^2 + b^2 = 13^2$, so $b^2 = 169 - 25 = 144$, $b = 12$

3 Not a perfect square?
Round the answer to the tenth.
Example: $4^2 + 5^2 = 41$, so c is about 6.4

4 Is it a right triangle?
Put the longest side in for c. If both sides of the formula match, it is a right triangle.
Example: $5^2 + 12^2 = 169$ and $13^2 = 169$. Yes.

Pythagorean Theorem – The Pythagorean Theorem

25 PAGES



Bright Path Sped

Terms of Use

Please read before you print your first page.

One classroom license

- This file is for one classroom: one teacher, one group of students.
- Please do not share it, post it online, or sell it.
- Extra licenses for a team or a school are available on the product page.

This is a fillable PDF

- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- The name line, every answer box, every ruled work box and every check box on the student pages are type-in fields, and so are the tracker, class grid and team note. You can also print any page and write by hand.
- It works offline, with no account or subscription.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart. Every student page is black and white inside a colored border, so it still reads when copied in black and white.

Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder, and use a first name only on any page that leaves your hands.

Need help?

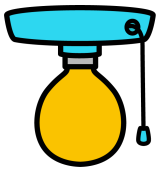
If a field will not behave or a page will not print the way you expect, use Ask a Question on the product page before leaving a review. Fixes ship as free updates in My Purchases.

© Bright Path Sped. For single-classroom use by the original purchaser.

PREVIEW

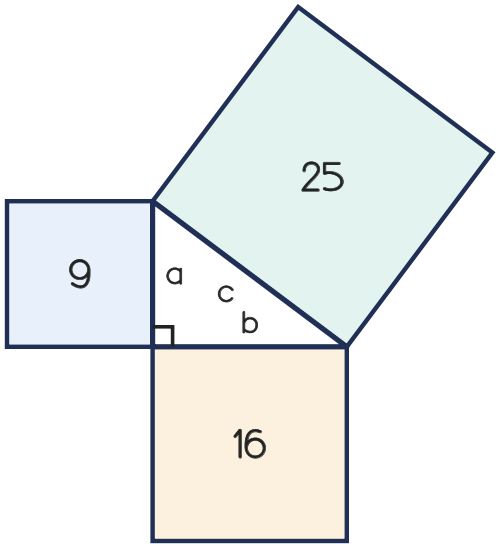
Preview - Bright Path Sped

My name _____ Date _____



The Pythagorean Theorem

Read the steps. Keep this page next to you.



Legs (a and b): the two sides that make the right angle. The little square marks it.

Hypotenuse (c): the side across from the right angle. It is the longest side.

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

Area of the two small squares: 9 + 16 = 25. That is the area of the big square.

1 Find the hypotenuse

Square both legs. Add them. Take the square root.

Example: $3^2 + 4^2 = 9 + 16 = 25$, so $c = 5$

2 Find a leg

Square the hypotenuse and the leg you know. Subtract. Take the square root.

Example: $5^2 + b^2 = 13^2$, so $b^2 = 169 - 25 = 144$, $b = 12$

3 Not a perfect square?

Round the answer to the tenth.

Example: $4^2 + 5^2 = 41$, so c is about 6.4

4 Is it a right triangle?

Put the longest side in for c. If both sides of the formula match, it is a right triangle.

Example: $5^2 + 12^2 = 169$ and $13^2 = 169$. Yes.

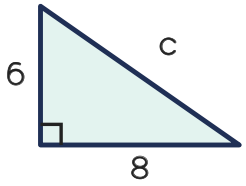
PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

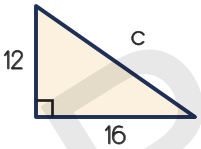
Worked Example 1

Read the example. Then fill in the blanks.



Example. The legs are 6 and 8. Find the hypotenuse. The numbers are made up for practice.

Start	$a^2 + b^2 = c^2$ Start with the formula.
Step 1	$6^2 + 8^2 = c^2$ Put in the two legs. The hypotenuse is c.
Step 2	$36 + 64 = 100 = c^2$ Square each leg. Add them.
Step 3	$c = 10$ Take the square root.
Check	$6^2 + 8^2 = 100$ and $10^2 = 100$. They match. Check. Put c back in.



Your turn. The legs are 12 and 16. Do the same steps.

Start	Start with the formula.	$a^2 + b^2 = c^2$
Step 1	Put in the two legs. The hypotenuse is c.	
Step 2	Square each leg. Add them.	
Step 3	Take the square root.	
Check	Check. Put c back in.	

PREVIEW

Preview - Bright Path Sped

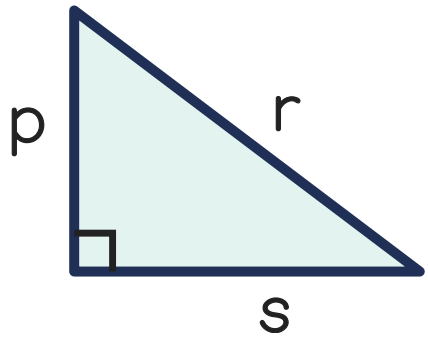
My name _____ Date _____

Name the Sides

Find the right angle. Name the legs and the hypotenuse.

The hypotenuse is across from the right angle. It is the longest side. Write the letters.

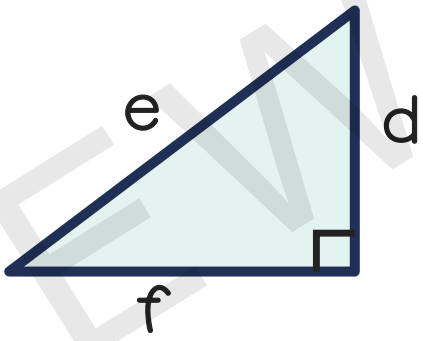
1 **Triangle 1**



Legs: ☐ **and** ☐

Hypotenuse: ☐

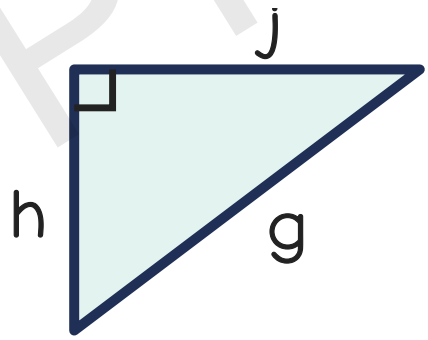
2 **Triangle 2**



Legs: ☐ **and** ☐

Hypotenuse: ☐

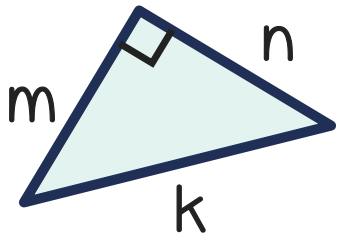
3 **Triangle 3**



Legs: ☐ **and** ☐

Hypotenuse: ☐

4 **Triangle 4**



Legs: ☐ **and** ☐

Hypotenuse: ☐

PREVIEW

Preview - Bright Path Shed

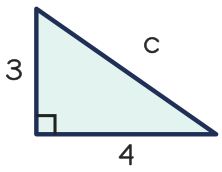
My name _____ Date _____

Find the Hypotenuse

Find the missing side. Show your steps.

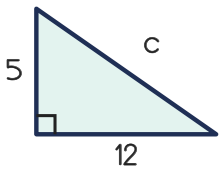
Both legs are given; the answers are whole numbers. Not drawn to scale.

1 **Find c.**



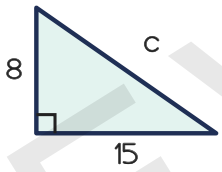
c = _____

2 **Find c.**



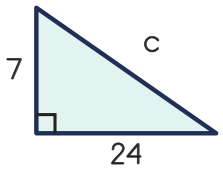
c = _____

3 **Find c.**



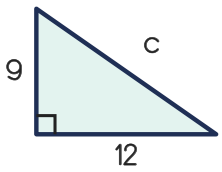
c = _____

4 **Find c.**



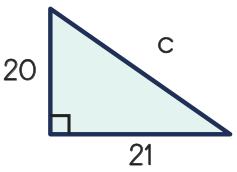
c = _____

5 **Find c.**



c = _____

6 **Find c.**



c = _____

PREVIEW

Preview - Bright Path Shed

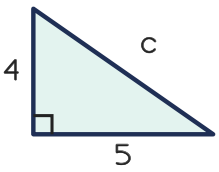
My name _____ Date _____

Round to the Tenth

Find the missing side. Show your steps.

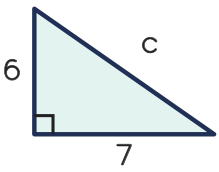
The answer is not a whole number, so round it to the tenth. Not drawn to scale.

1 **Find c.**



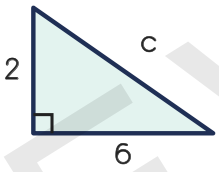
c = _____

2 **Find c.**



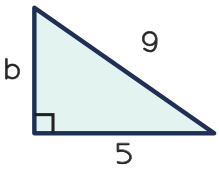
c = _____

3 **Find c.**



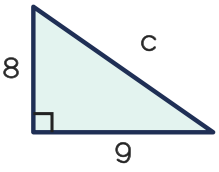
c = _____

4 **Find b.**



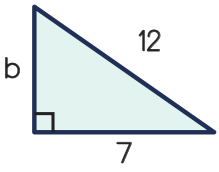
b = _____

5 **Find c.**



c = _____

6 **Find b.**



b = _____

PREVIEW

My name _____ Date _____

Find the Mistake

Find the mistake. Then fix it.

Sam is made up for practice. Each problem has one mistake.

1 **Sam: legs 6 and 8, find c**

1 $6^2 + 8^2 = c^2$
2 $6 + 8 = c$
3 $c = 14$

The mistake is on line

☐ 1 ☐ 2 ☐ 3

Fix it. Write the right answer.

2 **Sam: legs 5 and 12, find c**

1 $5^2 + 12^2 = c^2$
2 $25 + 144 = 169$
3 $c = 169$

The mistake is on line

☐ 1 ☐ 2 ☐ 3

Fix it. Write the right answer.

3 **Sam: leg 8, hypotenuse 17, find b**

1 $8^2 + b^2 = 17^2$
2 $64 + 289 = b^2$
3 $b^2 = 353$

The mistake is on line

☐ 1 ☐ 2 ☐ 3

Fix it. Write the right answer.

4 **Sam: is 9, 12, 15 a right triangle?**

1 $9^2 + 15^2 = 81 + 225 = 306$
2 $12^2 = 144$
3 306 is not 144, so it is not a right triangle.

The mistake is on line

☐ 1 ☐ 2 ☐ 3

Fix it. Write the right answer.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Exit Tickets

Do each one. Tell how sure you are.

Exit ticket 1 Legs 9 and 40. Find the hypotenuse.

My answer: _____ **How sure am I?**

☐ **sure** ☐ **kind of sure** ☐ **not sure**

Exit ticket 2 Leg 15 and hypotenuse 17. Find the other leg.

My answer: _____ **How sure am I?**

☐ **sure** ☐ **kind of sure** ☐ **not sure**

Exit ticket 3 Is it a right triangle? The sides are 7, 9 and 12.

My answer: _____ **How sure am I?**

☐ **sure** ☐ **kind of sure** ☐ **not sure**

PREVIEW

Answer Key: Sides and Practice

Every problem, its square and its answer.

Find the Hypotenuse page 9: both legs are given; the answers are whole numbers

#	Problem	Square and add or subtract	Answer
1	legs 3 and 4	9 + 16 = 25	c = 5
2	legs 5 and 12	25 + 144 = 169	c = 13
3	legs 8 and 15	64 + 225 = 289	c = 17
4	legs 7 and 24	49 + 576 = 625	c = 25
5	legs 9 and 12	81 + 144 = 225	c = 15
6	legs 20 and 21	400 + 441 = 841	c = 29

Find a Leg page 10: one leg and the hypotenuse are given; the answers are whole numbers

#	Problem	Square and add or subtract	Answer
1	leg 6, hypotenuse 10	100 - 36 = 64	b = 8
2	leg 8, hypotenuse 17	289 - 64 = 225	b = 15
3	leg 7, hypotenuse 25	625 - 49 = 576	b = 24
4	leg 9, hypotenuse 15	225 - 81 = 144	b = 12
5	leg 3, hypotenuse 5	25 - 9 = 16	b = 4
6	leg 10, hypotenuse 26	676 - 100 = 576	b = 24

Round to the Tenth page 11: the answer is not a whole number, so round it to the tenth

#	Problem	Square and add or subtract	Answer
1	legs 4 and 5	16 + 25 = 41	c = 6.4
2	legs 6 and 7	36 + 49 = 85	c = 9.2
3	legs 2 and 6	4 + 36 = 40	c = 6.3
4	leg 5, hypotenuse 9	81 - 25 = 56	b = 7.5
5	legs 8 and 9	64 + 81 = 145	c = 12.0
6	leg 7, hypotenuse 12	144 - 49 = 95	b = 9.7

Name the Sides page 7

#	Legs	Hypotenuse
1	p and s	r
2	d and f	e
3	h and j	g
4	m and n	k

Squares on the Sides page 8

#	Leg square	Leg square	Sum	c
1	9	16	25	c = 5
2	25	144	169	c = 13
3	36	64	100	c = 10
4	64	225	289	c = 17

Your turn answers (guided copies)

Page 5: legs 12 and 16: c = 20.
Page 6: leg 12, hypotenuse 20: b = 16.

How the answers were made

Every square was added or subtracted as a whole number by program, and the square root was taken only when the result is a perfect square. The rounded answers on page 11 are rounded to the tenth. Accept an answer one tenth off if a student rounded a calculator's longer decimal.

PREVIEW

Answer Key: Words, Exit, Sort

Word problems, exit tickets and the cut-and-paste match, with the common slips to listen for.

Word Problems page 14

#	Setup	Answer
1	$5^2 + b^2 = 13^2$, $b^2 = 144$	12 feet
2	$24^2 + 18^2 = c^2$, $c^2 = 900$	30 inches
3	$6^2 + 7^2 = c^2$, $c^2 = 85$	9.2 miles

Exit Tickets page 15

#	Problem	Answer
1	Legs 9 and 40	c = 41
2	Leg 15 and hypotenuse 17	b = 8
3	7, 9, 12	130 is not 144: No, not a right triangle

Common slips to watch for

- Adding the legs without squaring them.
- Stopping at c squared and forgetting the square root.
- Adding when a leg has to be found: it is a subtraction.
- Using a leg for c when testing a triangle.

Cut and Paste page 16

Piece (row, column)	Piece	Box
r1 c1	**legs 9 and 12**	c = 15
r1 c2	**legs 6 and 8**	c = 10
r1 c3	**legs 7 and 24**	c = 25
r2 c1	**legs 10 and 24**	c = 26
r2 c2	**legs 5 and 12**	c = 13
r2 c3	**legs 8 and 15**	c = 17

How the answers were made

Each answer was computed from the numbers printed on the page, and each word problem was checked by putting the answer back into the formula. Nothing here is typed from memory.

PREVIEW

Class Progress Grid

Every student on one grid: items right by page type.

Class or group _____ Month _____

Student	Sides and squares (of 8)	Find c (of 6)	Find a leg (of 6)	Round (of 6)	Test (of 6)	Mistakes (of 4)	Words, exit (of 6)	Sort (of 6)

PREVIEW

How to fill this in

For each column, add up how many items that student has right with no prompt (the tracker rows). One glance across a row shows which skill is easiest and which is next.

Grouping for small-group time

Students low in Sides and squares need the steps page (page 4) and the sides page (page 7). Students low in Find a leg need the second worked example (page 6). Students near full marks can move to the mistakes and the word problems (pages 13 and 14).

Marcus's Tracker (Invented Student)

Marcus T. is invented; nothing on this page describes a real student. The blank tracker is on page 20.

Student	Teacher	Month
Marcus T. (an invented student)	Ms. Reyes (invented)	November

Page	Page type and set	Items	Right	Date	Notes
7	Name the Sides	4	4	11/3	-
8	Squares on the Sides	4	4	11/5	-
9	Find the Hypotenuse	6	5	11/10	One squaring slip
10	Find a Leg	6	4	11/12	Added instead of subtracting twice
11	Round to the Tenth	6	3	11/17	Forgot to round three times
12	Is It a Right Triangle?	6	3	11/19	Used a leg for c on three items
13	Find the Mistake	4	-	-	-
14	Word Problems	3	-	-	-
15	Exit Tickets	3	-	-	-
16	Cut and Paste	6	-	-	-

PREVIEW

How to read it

Marcus T. has done **6 of 10** scored pages and got **23 of 32** items right with no prompt. **2** pages were all right and **4** carry a note. Every number comes from the table.

What the table points to

The lowest pages are Round to the Tenth (3 of 6) and Is It a Right Triangle? (3 of 6). Those are where the next practice goes. The 4 pages left blank are not tried yet, never wrong.