

8-1

Pythagorean Theorem
and Solving Right Triangles

I can solve right triangles.
I can use the pythagorean theorem.

Oct 27-4:52 PM

Right Triangle

The diagram shows a right-angled triangle with a right angle symbol at the bottom-left vertex. The two shorter sides are labeled 'Leg' with arrows pointing to them. The longest side, opposite the right angle, is labeled 'Hypotenuse' with a blue note 'longest side' written below it.

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Pythagorean Theorem

In a right triangle where a and b are the legs and c is the hypotenuse,

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

leg² + leg² = hyp² ← always hyp

The first diagram shows a right triangle with legs labeled 'a' and 'b', and hypotenuse labeled 'c'. The second diagram shows a right triangle with legs labeled 'a' and 'b', and hypotenuse labeled 'c'.

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The diagram illustrates a geometric proof of the Pythagorean theorem. It shows a large square with side length 'c' (the hypotenuse of a right triangle). Inside this square, four right triangles are arranged such that their hypotenuses form the outer boundary. The remaining space in the center is a smaller square with side length 'a-b'. The area of the large square is equal to the sum of the areas of the four right triangles and the central square.

Feb 2-6:52 AM

A small yellow right-angled triangle is shown in the bottom-left corner of the box.

Feb 2-7:37 AM

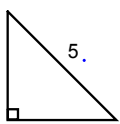
Find the missing side in the right triangle using the pythagorean theorem:

ex. $3^2 + 4^2 = c^2$
 $9 + 16 = c^2$
 $\sqrt{c^2} = \sqrt{25}$
 $c = 5$

ex. $5^2 + 12^2 = c^2$
 $169 = c^2$
 $c = 13$

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Find the missing side in the right triangle using the pythagorean theorem:

ex. 

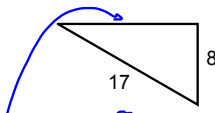
$$3^2 + b^2 = 5^2$$

$$9 + b^2 = 25$$

$$-9 \quad -9$$

$$b^2 = 16$$

$$b = 4$$

ex. 

$$8^2 + b^2 = 17^2$$

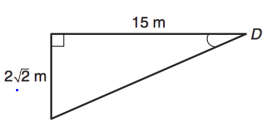
$$64 + b^2 = 289$$

$$b^2 = 225$$

$$b = 15$$

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Find the missing side in the right triangle using the pythagorean theorem:

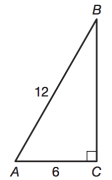
ex. 

$$15^2 + (2\sqrt{2})^2 = c^2$$

$$225 + 8 = c^2$$

$$c^2 = 233$$

$$c = \sqrt{233}$$

ex. 

$$6^2 + a^2 = 12^2$$

$$a^2 = 108$$

$$a = \sqrt{108}$$

$$a = 6\sqrt{3}$$

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How to find trig in **RIGHT** triangles:

SOH CAH TOA

~~Honors*~~

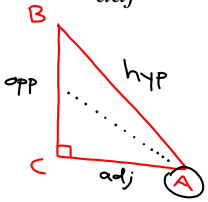
$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

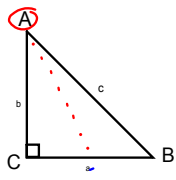
$$\csc \theta = \frac{\text{hyp}}{\text{opp}}$$

$$\sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\cot \theta = \frac{\text{adj}}{\text{opp}}$$


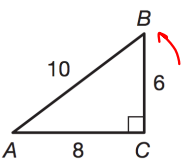
Oct 27-5:20 PM

Find:

sinA = a/a	sinB = b/c	
cosA = a/b	cosB = a/a	
tanA = b/a	tanB = a/b	
*cscA =	*cscB =	
*secA =	*secB =	
*cotA =	*cotB =	

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Find:

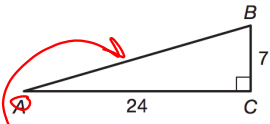
$\sin A = \frac{6}{10}$	$\sin B = \frac{8}{10}$	
$\cos A = \frac{8}{10}$	$\cos B = \frac{6}{10}$	
$\tan A = \frac{6}{8}$	$\tan B = \frac{8}{6}$	
*cscA =	*cscB =	
*secA =	*secB =	
*cotA =	*cotB =	

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Find: $\sin A = \frac{7}{25}$

$\cos A = \frac{24}{25}$

$\tan A = \frac{7}{24}$



$$24^2 + 7^2 = c^2$$

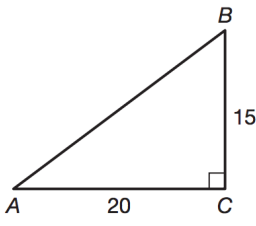
$$625 = c^2$$

$$c = 25$$

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Find:

$\sin A =$ $\csc A =$
 $\cos A =$ $\sec A =$
 $\tan A =$ $\cot A =$



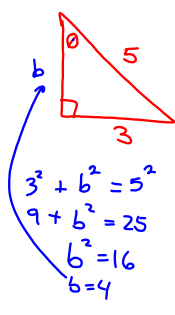
Oct 28-10:55 AM

Find the all other trigonometric functions:
 (hint: draw a triangle)

$\sin \theta = \frac{3}{5}$ *opp* / *hyp*

$\cos \theta = \frac{4}{5}$

$\tan \theta = \frac{3}{4}$



Oct 28-12:02 PM

Find the other six trigonometric functions:
 (hint: draw a triangle)

$\cos \theta = \frac{12}{13}$

Oct 28-12:02 PM

You want to hang up christmas lights on your house. There are bushes around your house, so the ladder has to be set up 5 feet away from your house. If your roof is 21 feet tall, to the nearest foot, how tall does your ladder need to be? Draw a diagram.

Oct 27-6:24 PM

A moving truck is equipped with a ramp that extends from the back of the truck to the ground. When the ramp is fully extended, it touches the ground 12 feet from the back of the truck. The height of the ramp is 2.5 feet. Draw a diagram then find the length of the ramp to the nearest tenth of a foot.

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