

(A) Lesson Context

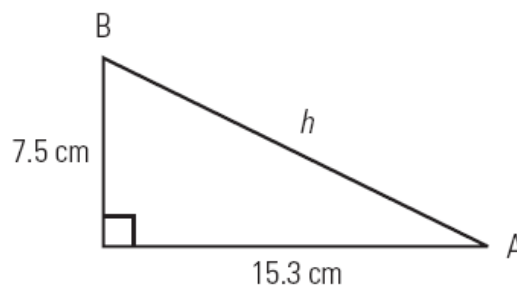
BIG PICTURE of this UNIT:	<ul style="list-style-type: none"> • How do I determine the measure of angles in geometric shapes, without direct measurement? • How do I solve for sides or angles in right triangles? • How do I model real world scenarios using right triangles? 		
CONTEXT of this LESSON:	<p>Where we've been</p> <p>You know how to work with sides and angles of right triangles.</p>	<p>Where we are</p> <p>What is the relationship between the ratios of sides of right triangles and the measure of the non-right angles in the right triangle</p>	<p>Where we are heading</p> <p>How can I solve problems that require geometric models using right triangles?</p>

(B) Lesson Objectives:

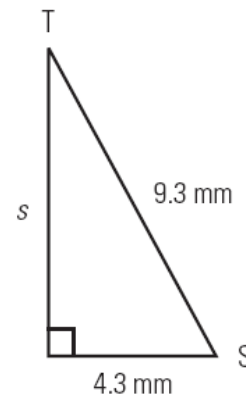
- Exploring the relationship between the ratio of the sides of a right triangle and the measurement of the non-right angles
- Introduce terminology used in trigonometry

(C) FAST FIVE: Pythagorean Theorem

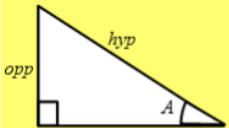

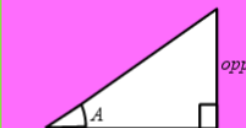
(D) **Example 1:** Find the value of the hypotenuse, h .



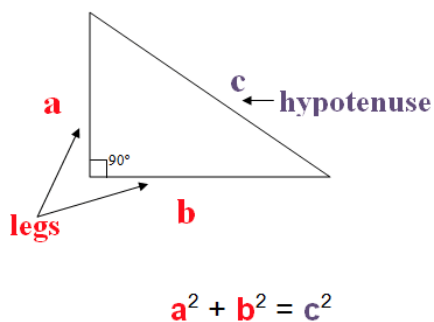
(E) **Example 2:** Find the missing side, s , using the Pythagorean Theorem.



Soh-Cah-Toa

Sine	Cosine	Tangent
 <p>Sine of angle A = $\frac{\text{Opp}}{\text{Hyp}}$</p>	 <p>Cosine of angle A = $\frac{\text{Adj}}{\text{Hyp}}$</p>	 <p>Tangent of angle A = $\frac{\text{Opp}}{\text{Adj}}$</p>

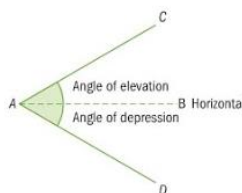
Pythagorean Theorem



One more note for RTT.

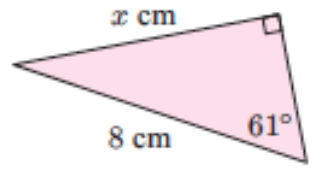
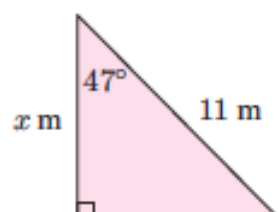
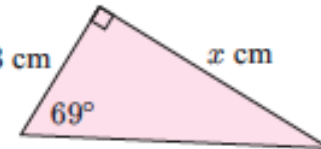
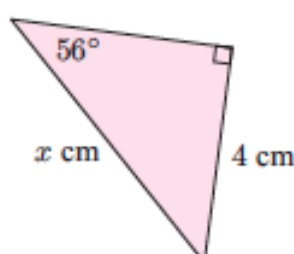
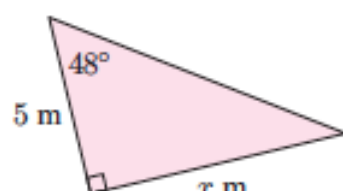
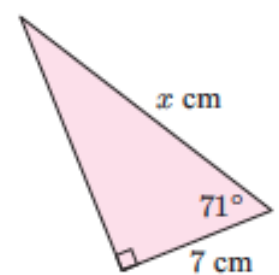
Let's begin with some terminology.

→ The **angle of elevation** is the angle 'up' from horizontal.
The **angle of depression** is the angle 'down' from horizontal.



Please solve for the indicated variable. Round to 3 decimal places.

Find, to 3 significant figures, the unknown length in the following triangles:

<p>a</p> 	<p>b</p> 	<p>c</p> 
<p>d</p> 	<p>e</p> 	<p>f</p> 

Complex Situations

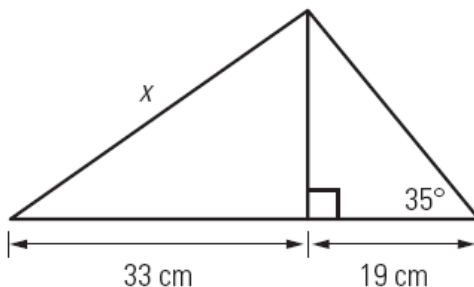
For those of you NOT ready or confident of working with the trig ratios YET, [follow this link](#) and work through more practice questions from this worksheet

(<http://cdn.kutasoftware.com/Worksheets/Geo/9-Solving%20Right%20Triangles.pdf>)

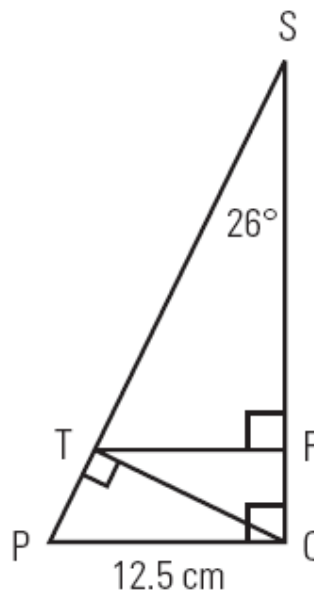
Trigonometric ratios can be used to solve real-life situations; these calculations may require multiple steps.

Note: the sum of the angles in a triangle is 180°.

What is the length of x ?

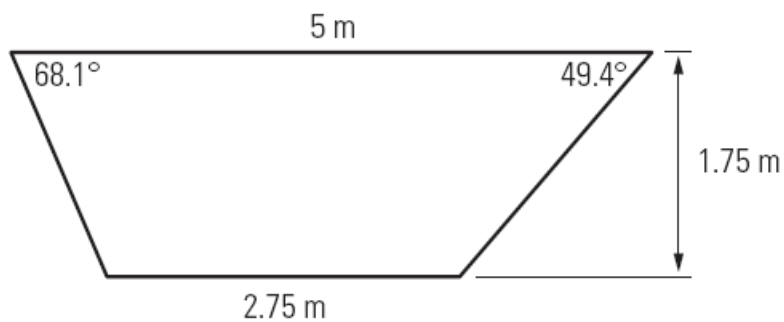


Solve for QS, ST, and RT.

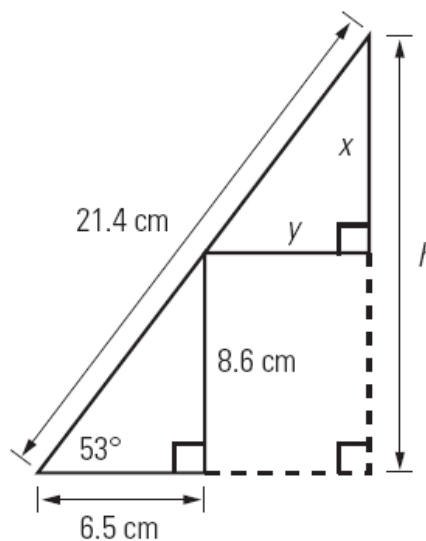


Lesson 1: Trigonometry Exploration Day 2 | Unit 3 – Trigonometry

Pauline is building a fence around her vegetable garden, shown below. What length of fence will she need to build?



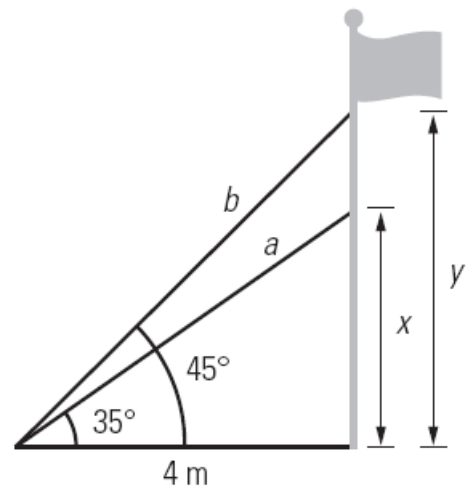
Calculate x , y , and h for the following diagram.



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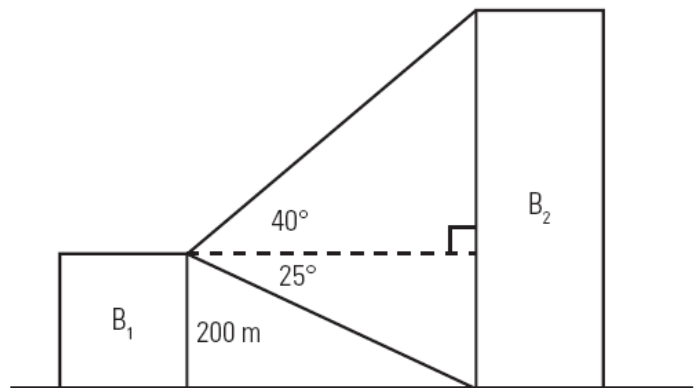
A flagpole is supported by two guy wires, each attached to a peg in the ground 4 m from the base of the pole. The guy wires have angles of elevations of 35° and 45° .

- a) How much higher up the flagpole is the top guy wire attached?



- b) How long is each guy wire?

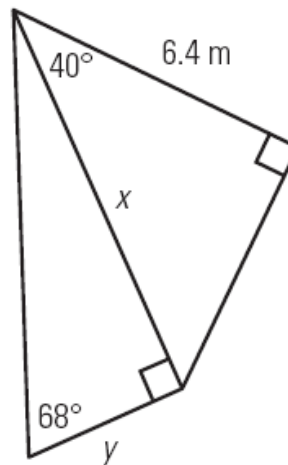
From the top of a 200 m-tall office building, the angle of elevation to the top of another building is 40° . The angle of depression to the bottom of the second building is 25° . **How tall is the second building?**



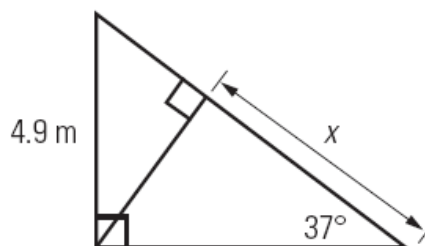
Lesson 1: Trigonometry Exploration Day 2 | Unit 3 – Trigonometry

More complex problems may require you to break down the problem into two or more triangles with work through several steps. You can use the values from one triangle in the other if they share a common edge.

Example 1: Solve for x and y in the following diagram.



1. Calculate x in the following diagram.



Challenge Problem!

Mr. Smith and Mr. Santowski are trying to figure out the height of a new building recently constructed in Cairo. They call it the Super Building. Mr. Smith started from the base of the building and walked for a while... then took an angle measurement from the ground to the top of the building... the device read 80.8858° . Then Mr. Smith realized he didn't count how far he was away from the base of the building. Mr. Santowski, not wanting to walk back, said... I have an idea. Mr. Santowski walked 13 more meters away from their current location and took another angle measurement from the ground. The measuring device read 73.3289° .

It was now that Mr. Santowski could figure out how tall the building is...

1. Draw a picture of this problem.
2. How tall is the building? Show your work.
3. How far was Mr. Smith from the base of the building when he took his first measurement?