

# EQ: SRT.8 How do I use trig to find missing side lengths of right triangles?

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<p><b>Week 8, Lesson 1</b></p> <ol style="list-style-type: none"> <li>1. Warm Up</li> <li>2. Practice</li> <li>3. Activity</li> <li>4. Closure</li> </ol> <p style="font-size: 48pt; font-weight: bold; text-align: center;">36</p>	<p><b>Finding Sides of Right Triangles</b></p>  <p style="font-size: 48pt; font-weight: bold; text-align: center;">37</p>
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## Warm Up:

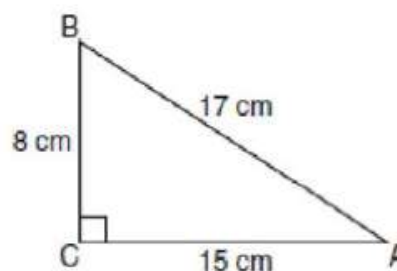
### Question 1:

In  $\triangle ABC$ ,  $m\angle C = 90$ . If  $AB = 5$  and  $AC = 4$ , which statement is *not* true?

- 1)  $\cos A = \frac{4}{5}$    2)  $\tan A = \frac{3}{4}$    3)  $\sin B = \frac{4}{5}$   
 4)  $\tan B = \frac{5}{3}$

### Question 2:

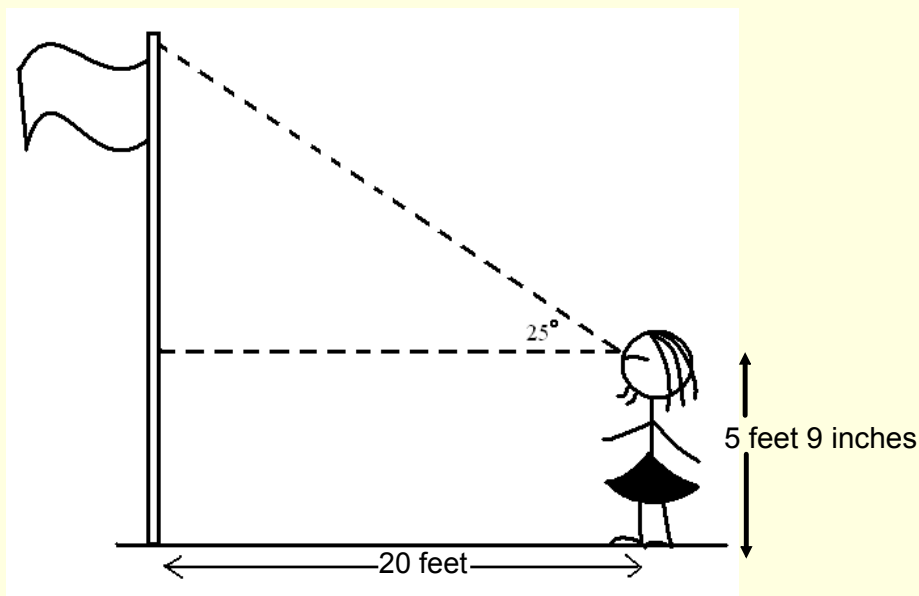
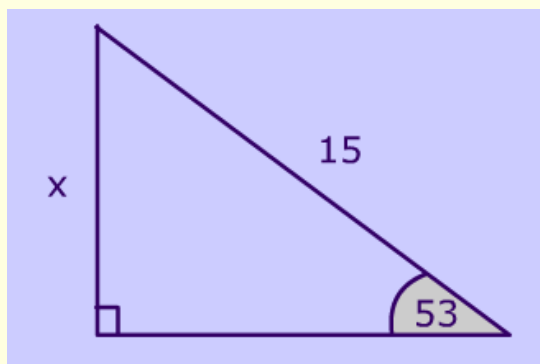
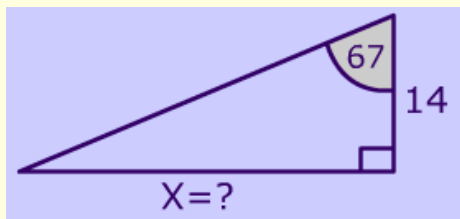
Which equation shows a correct trigonometric ratio for angle  $A$  in the right triangle below?



- 1)  $\sin A = \frac{15}{17}$    2)  $\tan A = \frac{8}{17}$    3)  $\cos A = \frac{15}{17}$   
 4)  $\tan A = \frac{5}{8}$

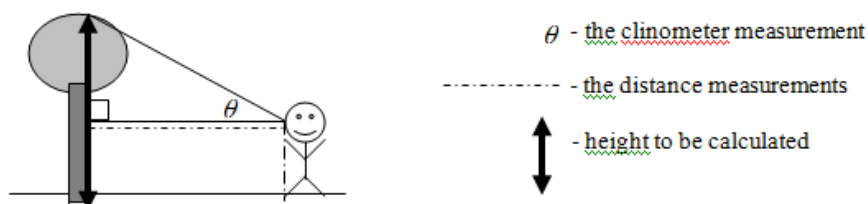
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### Left-Side Review



### Clinometer Activity

A clinometer is used to indirectly determine the height of an object that is too tall to measure. Clinometers are often used in ecology or forestry research to determine the height of trees that are being measured. A clinometer tells you the angle from your eye to the top of the object you are looking at. If you know this angle and the distance you are standing from the base of the object you are measuring, you can calculate the height of the object, using trigonometry.



#### To use your clinometer:

- one group member must look through the straw at the top of the object you want to calculate the height of.
- Another group member will wait until the string stops moving then read the measurement on the protractor that the string points to. The way to read this angle is to determine how many degrees away from  $90^\circ$  the string has moved.
- The third group member must measure the distance from the person looking through the clinometer to the base of the object and also the distance from the ground to the bottom of the clinometer as it is being used.

#### Assignment

For each item:

- measure the angle from your eye to the top of the item
- measure the exact distance you are standing from the base of the item
- measure the distance from the bottom of the clinometer (as it is being used) to the ground
- draw a sketch showing all the distances and the angle you measured. Label your sketch fully.
- set up your trig equation.
- Solve to find the height.

<b>Item #1: Where ceiling meets the wall of classroom</b>	<b>Item #2: Top of 300 building</b>
<p>Measurements &amp; Sketch:</p> <p>Trig Equation:</p> <p>Height: _____</p>	<p>Measurements &amp; Sketch:</p> <p>Trig Equation:</p> <p>Height: _____</p>

Don't forget to add the height from the clinometer to the ground!!!!



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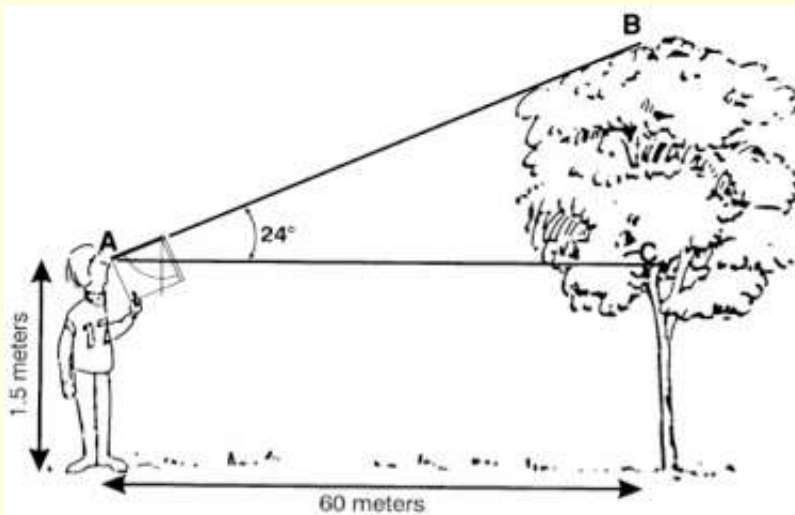
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<p><b>Week 8, Lesson 2</b></p> <ol style="list-style-type: none"> <li>1. Warm Up</li> <li>2. Notes</li> <li>3. Poster Problems</li> <li>4. Closure</li> </ol>	<p><b>Poster Project</b></p>
52	53

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## Warm Up:

Given the diagram below, how high is the tree, in meters?

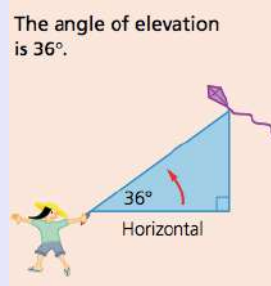


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angle of elevation

formed by looking up from the horizontal

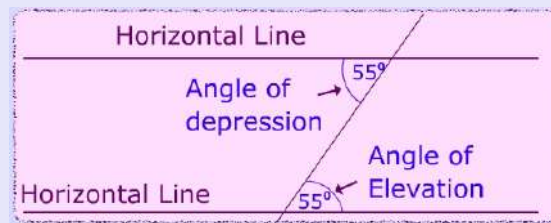


angle of depression

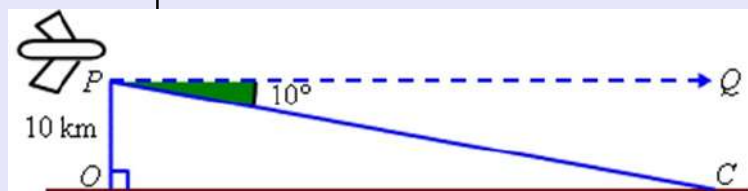
formed by looking down from the horizontal



when given in a word problem, the angle of depression = the angle of elevation



Ex: An airplane is preparing to land. It has an altitude of 10 km and an angle of depression of  $10^\circ$ . How many more kilometers does it have to land?



Summary:

ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity

## Poster Problems!

Each group will get 3 problems.

One problem is common - everyone has the same one. You will tape it onto your poster and answer it together.

Two problems are unique (slightly different for each group). You will draw and label a diagram for the first problem and then use trigonometry to solve it. Show your equations and as much work as you can.

You will find the four ways to solve the second problem - be sure that each of your equations are solved for x. (EX:  $x = 25 \tan 33$ ) Cut out the picture given and attach it to your poster next to your solutions.

Finally, don't forget to add in a title to your poster! This can be unique and creative... but always classroom-appropriate! :)

Alfred found the following picture. He then followed this reasoning:

$$\sin A = \frac{BC}{AB}$$

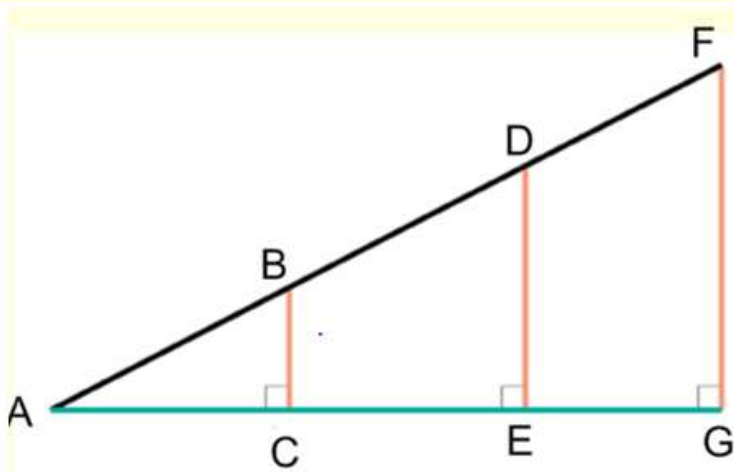
$$\sin A = \frac{AE}{AD}$$

$$\sin A = \frac{FG}{AF}$$

Since  $\angle A$  stayed the same, he figure he could re-write it like this:

$$\frac{BC}{AB} = \frac{AE}{AD} = \frac{FG}{AF}$$

Unfortunately, he made a mistake. What was his mistake and how should he fix it?

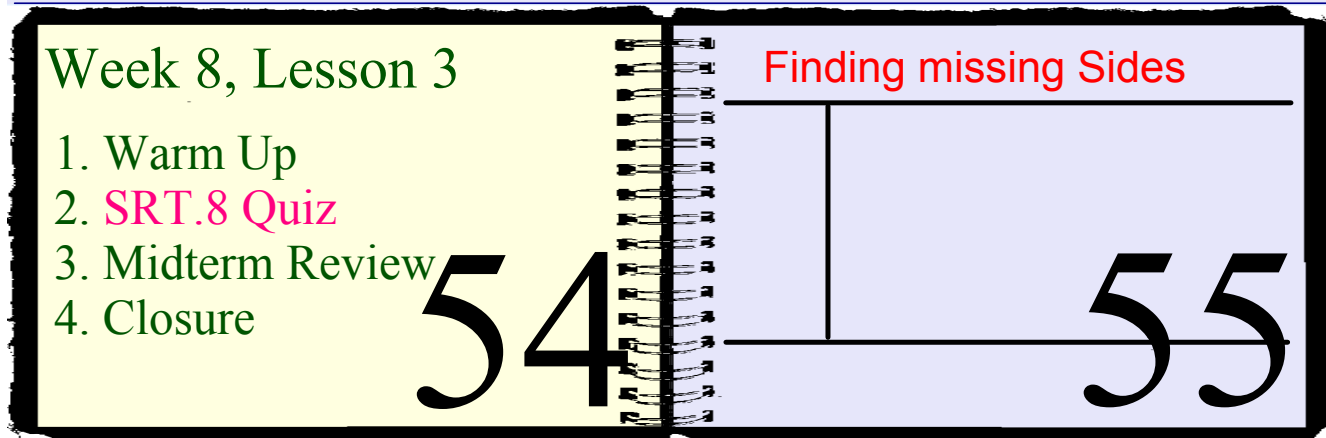






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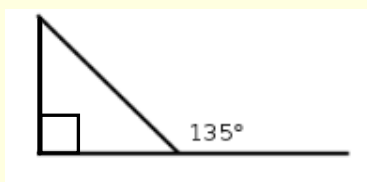
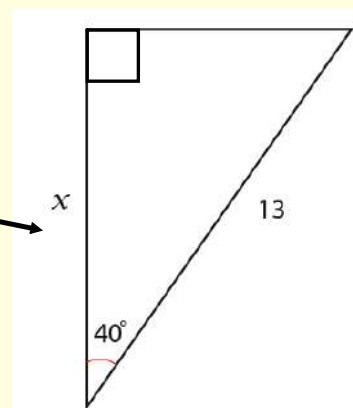
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## Warm Up:

To prepare for the quiz, take a few minutes to look over pages 32-36 and the worksheets we did on those pages.

Then, self-assess by answering the following questions:

1. Do you know how to set up SOH CAH TOA equations to find missing sides?
2. Do you know multiple ways to solve for a missing side?
3. Given the following diagram, do you know the measure of all the other angles?



# SRT.8 Quiz

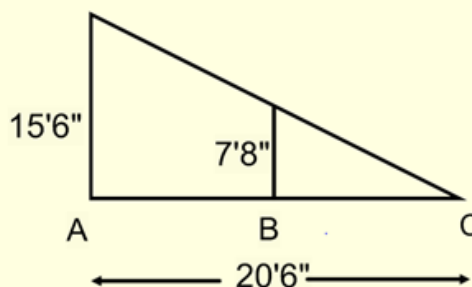
### ROTATION 1

(Please write all answers in your IAN.)

On a safari, a car full of tourists has a height of 7'8" and is parked at point B. Next to the car, an adult elephant stands with a height of 15'6" at point A. If the elephant casts a shadow that is 20'6" long, how far away is the elephant from the car?

(HINT: because you have similar triangles, you can set up a proportion.)

Round to the nearest foot.



### ROTATION 2

(Please write all answers in your IAN.)

Square ABCD is dilated about the origin by a scale factor of 3 to form square A'B'C'D'.

The perimeter of the original square is 40 cm.

(a) What is the length of each side of the original square?

(b) If the scale factor is 3, what is the new length of the sides of square A'B'C'D'?

(HINT: In dilations, you multiply by the scale factor.)

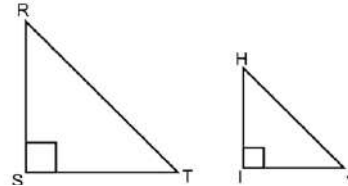
(c) What is the new perimeter of A'B'C'D'?

### ROTATION 3

(Please write all answers in your IAN.)

1. If the two triangles below are similar, which ratio can be used to find  $\tan R$ ?

- (a)  $\frac{HI}{HJ}$     (b)  $\frac{IJ}{HJ}$     (c)  $\frac{HI}{IJ}$     (d)  $\frac{IJ}{HI}$



2. If  $\triangle ABC \sim \triangle DEF$  and  $\tan A = \frac{4}{3}$ , what is  $\sin D$ ?

- (a)  $\frac{3}{5}$     (b)  $\frac{4}{5}$     (c)  $\frac{3}{4}$     (d)  $\frac{4}{3}$

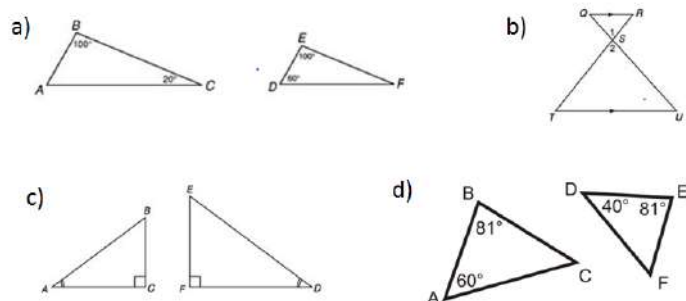
### ROTATION 4

(Please write all answers in your IAN.)

#1 - Triangle ABC is dilated, with the center of dilation at the origin to form triangle  $A'B'C'$ . Which of the following statements must be **FALSE**?

- (a)  $\angle ABC \cong \angle A'B'C'$     (b)  $\triangle ABC \cong \triangle A'B'C'$   
 (c)  $\triangle DEF \sim \triangle D'E'F'$     (d)  $\frac{DE}{EF} = \frac{D'E'}{E'F'}$

#2 - Which of the following triangles is **NOT** similar by  $AA^\sim$ ?



## ROTATION 5

(Please write all answers in your IAN.)

If  $\triangle ABC \sim \triangle DEF$  and  $\tan A = \frac{3}{4}$ , what is  $\sin D$ ?

Step 1: Draw two right triangles. Label one ABC and the other DEF.

Step 2: Fill in where the 3 and the 4 should go on triangle ABC, since  $\tan A = \frac{3}{4}$ .

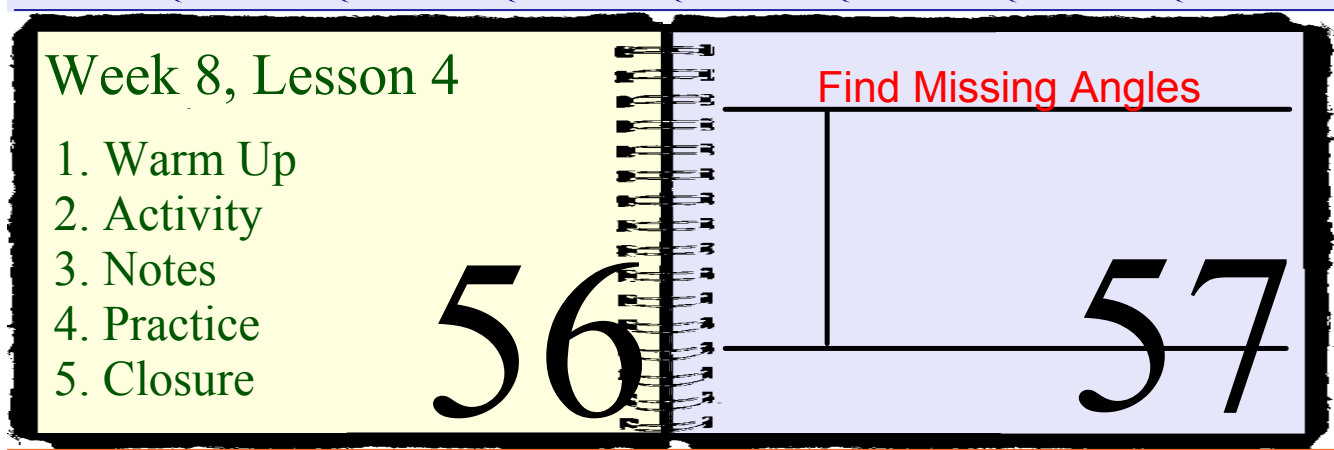
Step 3: Use the Pythagorean Theorem to find the last side.

Step 4: ABC and DEF are similar. Write the  $\sin$  of angle D using your values from ABC.



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**Warm Up:**

Juan is flying a kite at the park and realizes that all 500 feet of string are out. Margie measures the angle of the string with the ground and finds it to be about  $42^\circ$ . How high is Juan's kite above the ground, if Juan is about 6 feet 3 inches tall?

*(Draw a picture first and label it with the information given.)*







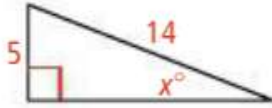


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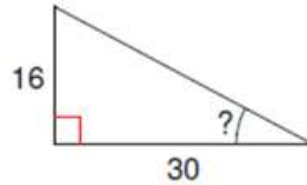
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**Inverse Trig**

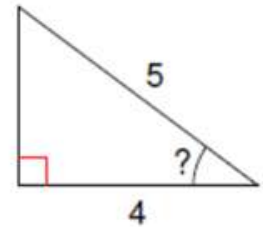
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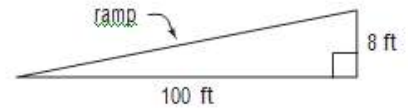
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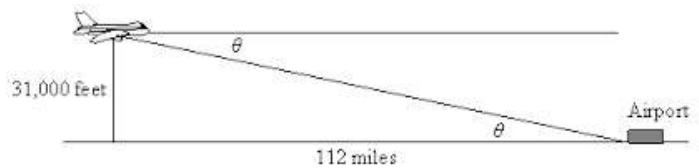
3.



4. An architect is designing a wheelchair ramp for a new building. The dimensions are shown in the figure at the right. What is the angle of elevation of the ramp?



5. Given the diagram at the right, what must be the airplane's angle of descent? (1 mile = 5280 feet)



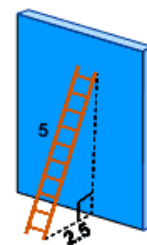
6. The circus is in town and you are part of the crew that is setting up its enormous tent! The center pole that holds up the tent is 70 feet tall. To keep it in place, a support cable is attached to the top of the pole so that the cable is 20 feet from the base of the pole.

(a) Draw a label a picture.

(b) What is the angle that the cable makes with the ground?

(c) How long of a cable was used?

7. A ladder is 5-feet long and leans against the wall, 2.5 feet away. What is the angle that the ladder makes with the ground?





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Week , Lesson

1. Warm Up
- 2.
- 3.
4. Closure

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Warm Up:

