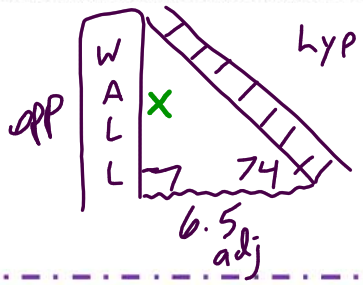
★DESMOS★ - calculator app

Name:_____
Period:____

Date:_____
Mr. Valentino

Aim: How can we solve real world problems with trigonometry?

Do Now: A ladder leaning against the wall makes an angle of 74° with the ground. If the foot of the ladder is 6.5 feet from the wall, how high on the wall is the ladder?

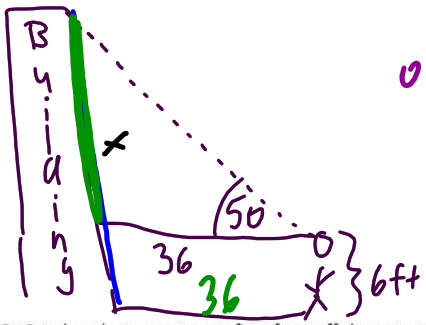


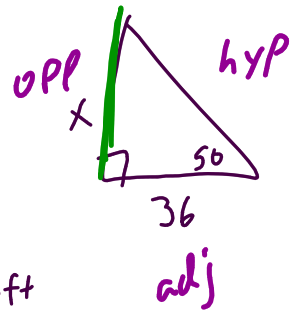
~~SOH~~ ~~CAH~~ TOA

$\tan 74 = \frac{x}{6.5}$

$x = 6.5 \tan 74 = 23$ ft

1. Mason, whose eyes are six feet off the ground, is standing 36 feet away from the base of a building, and he looks up at a 50° angle of elevation to a point on the edge of building's roof. To the nearest foot, how tall is the building?





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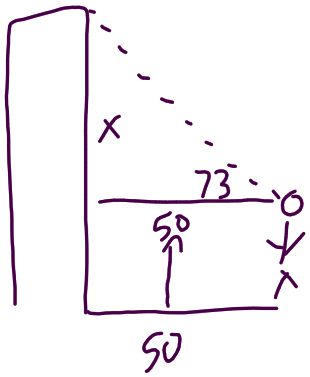
$\tan 50 = \frac{x}{36}$

$x = 36 \tan 50$

$= 43$ ft $+6 =$ 49ft

2. Sarah, whose eyes are five feet off the ground, is standing 50 feet away from the base of a building, and she looks up at a 73° angle of elevation to a point on the edge of building's roof. To the nearest foot, how tall is the building?



$\tan 73 = \frac{x}{50}$

$x = 50 \tan 73$

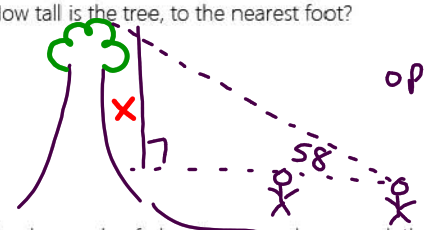
$x = 164$ ft

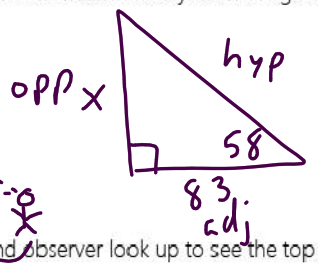
$+5$

169 ft

3. Two observers on the ground are looking up at the top of the same tree from two different points on the horizontal ground. The first observer, who is 83 feet away from the base of the tree, looks up at an angle of elevation of 58°. The second observer is standing only 46 feet from the base of the tree. (Note: you may ignore the heights of the observers and assume their measurements are made directly from the ground.)

a) How tall is the tree, to the nearest foot?





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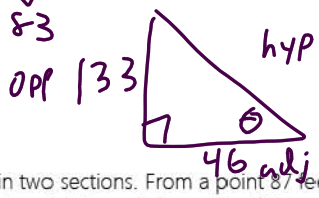
$\tan 58 = \frac{x}{83}$

$x = 83 \tan 58$

$= 133$ ft

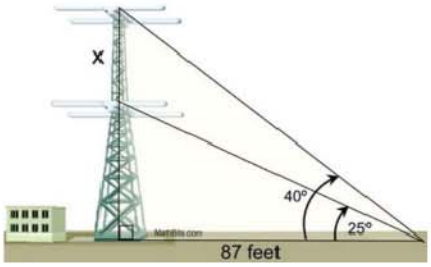
b) At what angle of elevation must the second observer look up to see the top of the tree to the nearest degree?



$\tan \theta = \frac{133}{46}$

$\tan^{-1}(133/46) = 71^\circ$

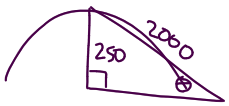
4. A radio station tower was built in two sections. From a point 87 feet from the base of the tower, the angle of elevation of the top of the first section is 25°, and the angle of elevation of the top of the second section is 40°. To the nearest foot, what is the height of the top section of the tower?



HW

Practice Problems – Partner Work

1. In order to reach the top of a hill which is 250 feet high, one must travel 2000 feet straight up a road which leads to the top. Find the number of degrees contained in the angle which the road makes with the horizontal (to the nearest degree).



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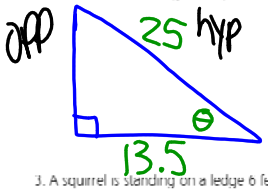
2. A 25 foot ladder leans against a building. The ladder's base is 13.5 feet from the building. Find the angle which the ladder makes with the ground (to the nearest degree).

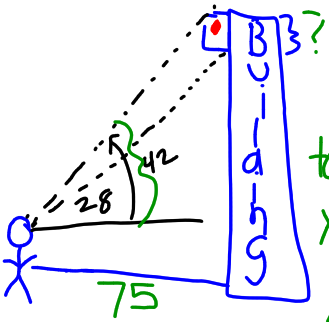


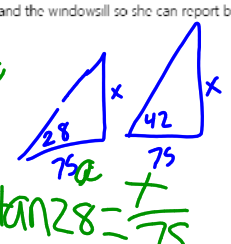
$\cos x = \frac{13.5}{25}$

$\cos^{-1}\left(\frac{13.5}{25}\right) = 57°$

3. A squirrel is standing on a ledge 6 feet off the ground. He looks up at the top of a tree at an angle of 34°. If the squirrel is 12 feet away from the tree, how tall is the tree to the nearest foot?

4. A firefighter on the ground sees a fire break through a window near the top of a building. The angle of elevation to the windowsill is 28°. The angle of elevation to the top of the building is 42°. If the firefighter is 75 feet from the building, what is the distance between the roof and the windowsill so she can report by radio to the firefighters on the roof (to the nearest foot)?





$\tan 28 = \frac{x}{75}$

$x = 75 \tan 28$

$x = 40 \text{ feet}$

$\tan 42 = \frac{x}{75}$

$x = 75 \tan 42$

$x = 68 \text{ feet}$

$68 - 40 = 28 \text{ feet}$