

NOTES

Day 2: Finding Angles using Right Triangle Trigonometry

Warm-Up: Find the value of x.

1. 2. 3. 4. 5.

Notes Day 2: Finding Angles using Right Triangle Trigonometry

Finding missing angles with the Trigonometric Ratios

To find missing angle measures, set up the trig ratio.

Then, you'll have to do the inverse of the trig function to both sides.

NOTE: the inverse of the trig function and the trig function itself cancel out!

TIP: The inverse looks like the trig function with a -1 exponent.

Example 4: Find tan A and tan C.

$\tan A = \frac{5}{12}$
 $\tan C = \frac{12}{5}$

Example 5: Find A and C.

$A = 22.6^\circ$
 $C = 67.4^\circ$

Example 6: Find x and y.

$x = 13 \sin(67)$
 $y = 13 \cos(67)$

Example 7: Find n.

$n = \sin^{-1}\left(\frac{22}{40}\right) = 33.4^\circ$

Ex 8: Find x.

$x = \cos^{-1}\left(\frac{3}{5}\right) = 53.1^\circ$

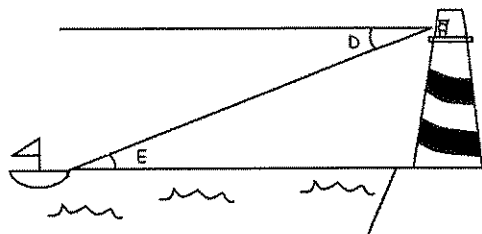
Practice: Finding angles - Rabbit Puzzle

Notes Day 2: Angle of Elevation and Angle of Depression

The top of a lighthouse is ^{continued} 50 feet above sea level. Suppose a lighthouse operator sees a sailboat at an angle of 22° with a horizontal line straight out from his line of vision.

The angle between the horizontal line and the line of sight is called the angle of depression (2D in pic)

At the same time, a person in the boat looks up at an angle of 6E with the horizon and sees the operator in the lighthouse. This angle is called the angle of elevation.



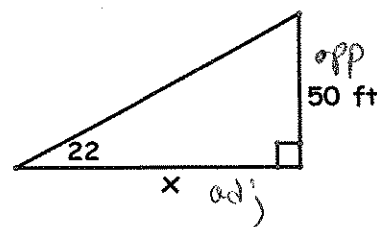
NOTE: The measure of the angle of depression ≅ the measure of the angle of elevation. **ALWAYS!!**

Example 1: The distance to the lighthouse from the sailboat can be found by

$$\frac{\tan(22)}{1} = \frac{50}{x}$$

$$x \frac{\tan(22)}{\tan(22)} = \frac{50}{\tan(22)}$$

$$x = 123.8 \text{ ft}$$



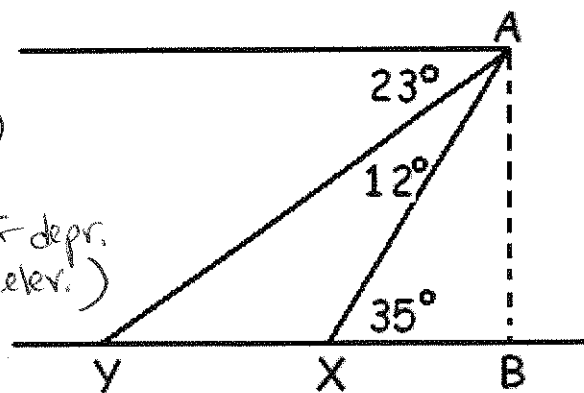
People at points X and Y see an airplane at A

The angle of elevation from X to A is 35°.

The angle of depression from A to X is 35° (do 23+12).

The angle of depression from A to Y is 23°.

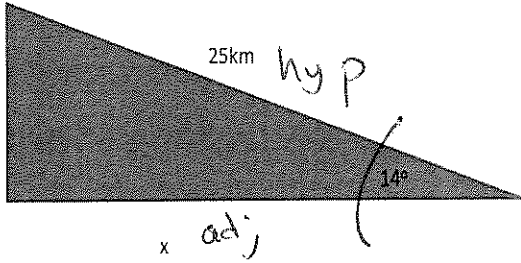
The angle of elevation from Y to A is 23° (because ∠ of depr. = ∠ of elev.)



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Example 3. Karen drives 25 km up a hill that is a grade of 14. What horizontal distance has she covered?

*Note: Picture is not drawn. We need to discuss how to set up a picture given the situation.



$$\frac{\cos(14)}{1} = \frac{x}{25}$$

$$x = 25 \cos(14)$$

$$x = 25.3 \text{ km}$$

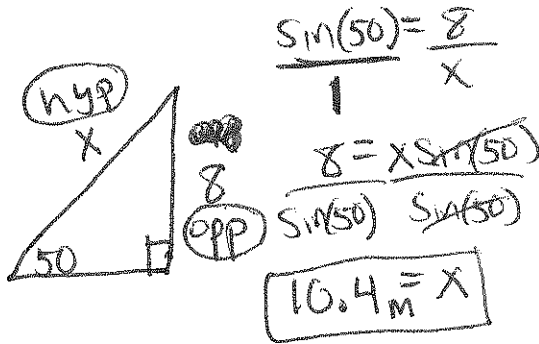
Day 2: Angle of Elevation and Angle of Depression Practice

For each problem: 1) Sketch a diagram.

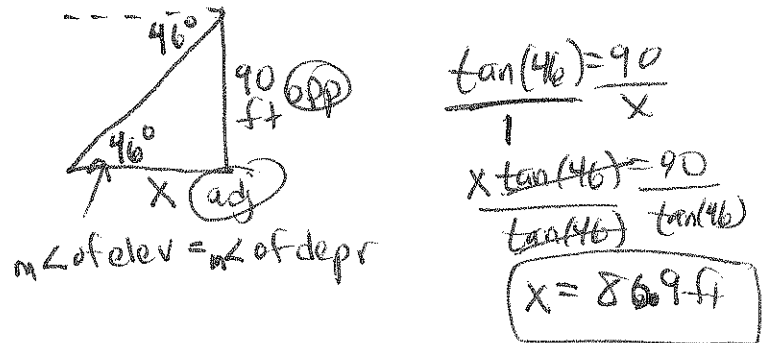
2) Set up the equation.

3) Solve.

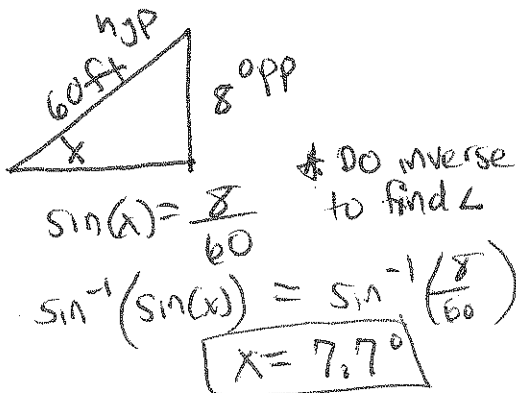
1) The leg opposite the 50 degree angle in a right triangle measures 8 meters. Find the length of the hypotenuse.



3) A cliff is 90 feet above the sea. From the cliff, the angle of depression of a boat measures 46 degrees. How far is the boat from the base of the cliff?



2) A ramp is 60 feet long. It rises a vertical distance of 8 feet. Find the angle of elevation.



4) A tree casts a 50-foot shadow while the angle of elevation of the sun is 48. How tall is the tree?

