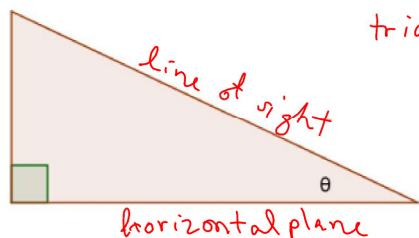


## Lesson 5 Solving Problems with Two Right Triangles

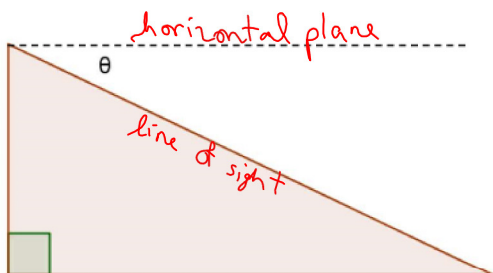
**Recall:**

**Angle of Elevation** (inside the triangle)



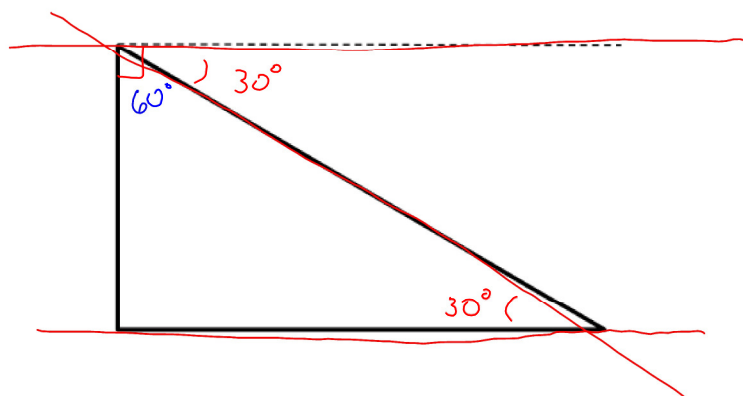
The angle of elevation is the angle formed by the line of sight and the horizontal plane for an object above the horizontal.

**Angle of Depression**



The angle of depression is the angle formed by the line of sight and the horizontal plane for an object below the horizontal.

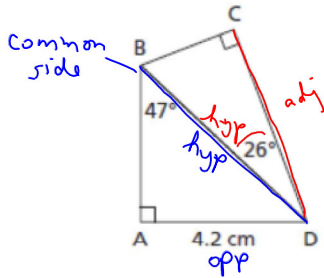
**Angle of Elevation = Angle of Depression**



# L5 Solving Problems with Two Right Triangles.notebook

## Example 1

Determine the length of CD correct to 3 decimal places.



① Use  $\triangle ABD$  to calculate the length of side  $BD$  (common side)

SOH CAH TOA

$$\sin 47^\circ = \frac{4.2}{BD}$$

$$BD \sin 47^\circ = 4.2$$

$$BD = \frac{4.2}{\sin 47^\circ}$$

$$BD = 5.74277\dots$$

② Determine the length of  $CD$

SOH CAH TOA

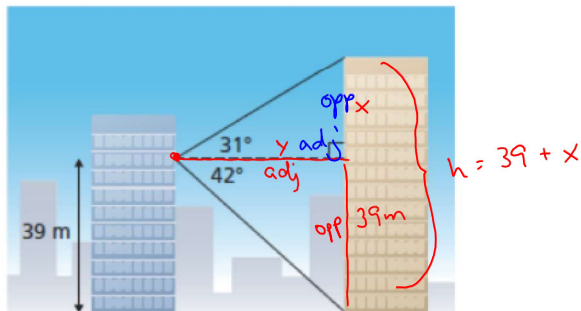
$$\cos 26^\circ = \frac{CD}{BD} \leftarrow \text{recalled answer } (5.74277\dots)$$

$$5.74277\dots (\cos 26^\circ) = CD$$

$$5.162 \text{ cm} = CD$$

**Example 2**

A surveyor stands at a window on the 9<sup>th</sup> floor of an office tower. He uses a clinometer to measure the angles of elevation and depression of the top and the base of a taller building. The surveyor sketches the following plan of his measurements. Determine the height of the taller building to the nearest tenth of a metre.



1. SOH CAH (TOA)

① Common side

$$\tan 42^\circ = \frac{39}{y}$$

$$y \tan 42^\circ = 39$$

$$y = \frac{39}{\tan 42^\circ}$$

$$y = 43.3138\dots$$

② Calculate  $x$

$$\tan 31^\circ = \frac{x}{43.3138\dots}$$

↑  
mult

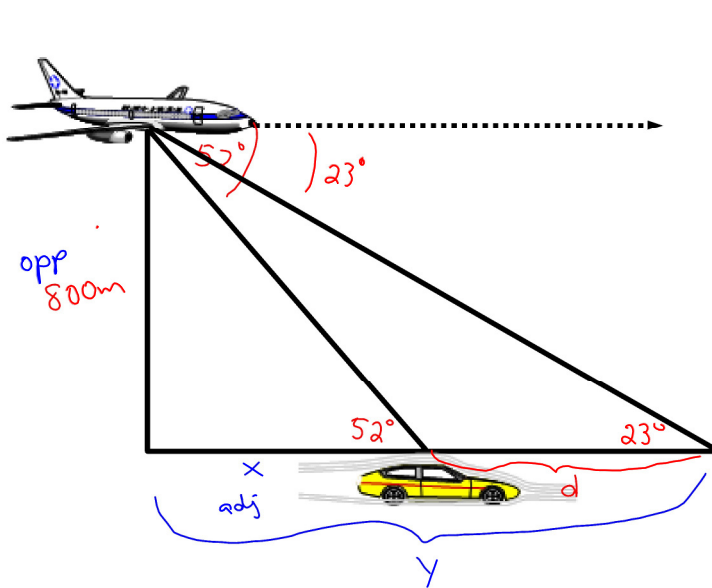
$$x = 26.025\dots$$

$$\begin{aligned} \text{height} &= 39 + x \\ &= 65.0 \text{ m} \end{aligned}$$

# L5 Solving Problems with Two Right Triangles.notebook

## Example 3

A police airplane, flying at an altitude of 800 m, spots a speeding vehicle at an angle of depression of  $52^\circ$ . If a roadblock is set up along the same highway at an angle of depression of  $23^\circ$ , determine the distance the vehicle is from the roadblock to the nearest hundredth of a kilometer.



$$\tan 52^\circ = \frac{800}{x}$$

$$x = \frac{800}{\tan 52^\circ}$$

$$x = 625.0285\dots$$

$$\tan 23^\circ = \frac{800}{y}$$

$$y = \frac{800}{\tan 23^\circ}$$

$$y = 1884.6818\dots$$

$$d = y - x$$

$$= 1884.6818\dots - 625.0285\dots$$

$$= 1259.6533\dots \text{ m}$$

$$\text{or } \frac{1259.6533\dots}{1000} = 1.26 \text{ km}$$

pg. 318  
# 4a, b, d, e

pg. 340  
# 4, 6, 7, 11