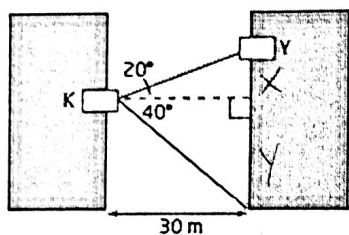


Problem Solving With Right Triangles | MPM2D

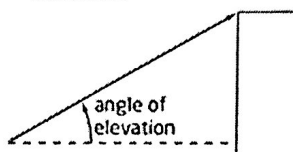
Example: Kim and Yuri live in apartment buildings that are 30 m apart, as shown. The from Kim's balcony to where Yuri's building meets the ground is 40°. The from Kim's balcony to Yuri's balcony is 20°.

- How high is Kim's balcony above the ground, to the nearest metre?
- How high is Yuri's balcony above the ground, to the nearest metre?



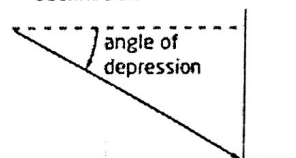
angle of elevation

- angle measured above the horizontal
- also called the angle of inclination

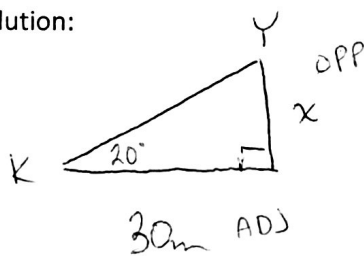


angle of depression

- angle measured below the horizontal
- also called the angle of declination



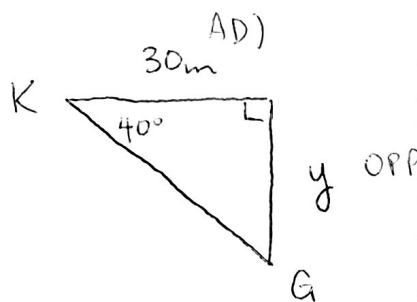
Solution:



$$\tan 20^\circ = \frac{x}{30}$$

$$x = 30 \tan 20^\circ$$

$$x = 10.92 \text{ m}$$



$$\tan 40^\circ = \frac{y}{30}$$

$$y = 30 \tan 40$$

$$y = 25.17 \text{ m}$$

- Kim's balcony is 25.17m high
- Yuri's balcony is 36.09m high (10.92 + 25.17)

Problem Solving With Right Triangles | MPM2D

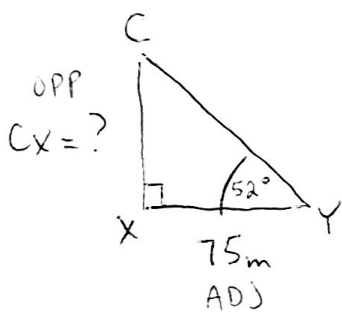
Example: Solve a 3D Problem

A theodolite is an instrument used by a surveyor to measure horizontal and vertical angles. Measurements are taken in order to find the height of a cliff on the other side of a river, as shown. Find the height of the cliff, to the nearest metre.

Solution:

$$\frac{O}{H} C \frac{A}{H} T \frac{O}{A}$$

1) Find CX

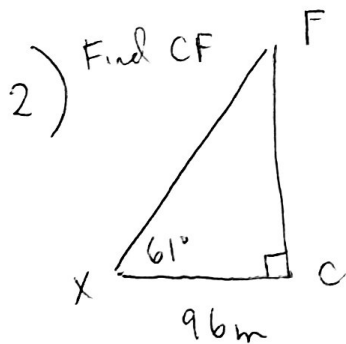
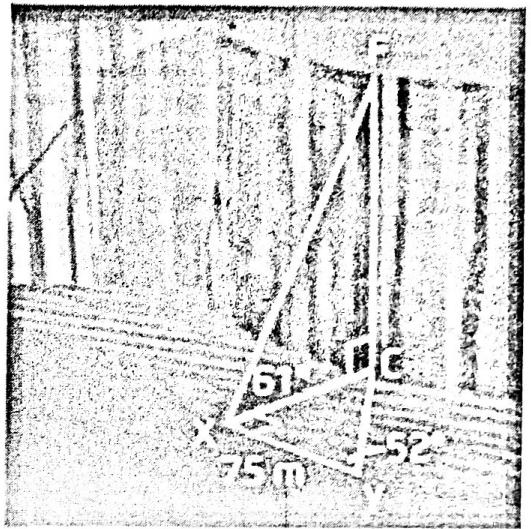


$$\frac{\tan 52^\circ}{1} = \frac{CX}{75}$$

$$CX = 75 \tan 52^\circ$$

$$CX = 96\text{m}$$

~~75~~



$$\tan 61^\circ = \frac{CF}{96}$$

$$CF = 96 \tan 61^\circ$$

$$CF = 173.19\text{m}$$

The cliff
is 173.19m
tall.