

# FoM11 Lesson 3.4

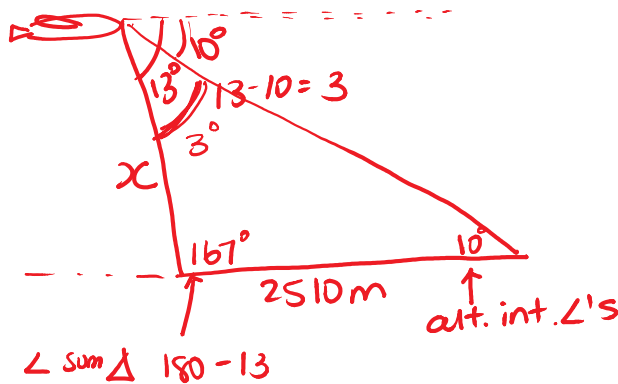
Monday, April 3, 2017 12:48 PM

Strategies we can use:  
 cosine Law, Sine law, pythagoras, angle &  $\Delta$ 's properties,  
 SOH CAH TOA

FOM 11

### 3.4 Solving Problems Using Acute Triangles

**Example 1:** When a plane is coming in to land at a 2510-m runway, the angles of depression to the ends of the runway are  $10^\circ$  and  $13^\circ$  respectively. How far is the plane from the end of the runway?



USE Sine law to find  $x$

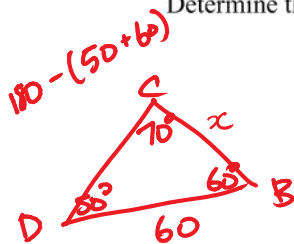
$$\frac{x}{\sin 10^\circ} = \frac{2510}{\sin 3^\circ}$$

$$x = 8328.059$$

The plane is 8328 m from the end of the runway.

**Example 2:** Brendan and Diana plan to climb the cliff at Dry Island Buffalo Jump, Alberta. They need to know the height of the climb before they start. Brendan stands at point  $B$ , as shown in the diagram. He uses a clinometer to determine  $\angle ABC$ , the angle of elevation to the top of the cliff. Then he estimates  $\angle CBD$ , the angle between the base of the cliff, himself, and Diana, who is standing at point  $D$ . Diana estimates  $\angle CDB$ , the angle between the base of the cliff, herself, and Brendan.

Determine the height of the cliff to the nearest metre.



find  $CB$ :

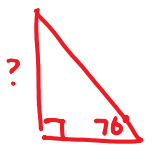
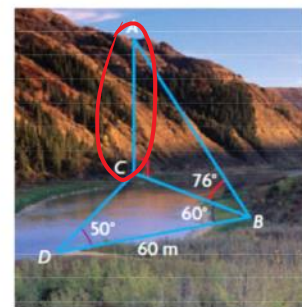
$$\frac{x}{\sin 50^\circ} = \frac{60}{\sin 70^\circ}$$

$$x = 48.91$$

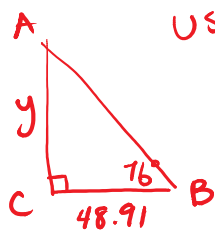
USE SOH CAH TOA to find  $y$ :

$$\frac{\tan 76^\circ}{1} = \frac{y}{48.91}$$

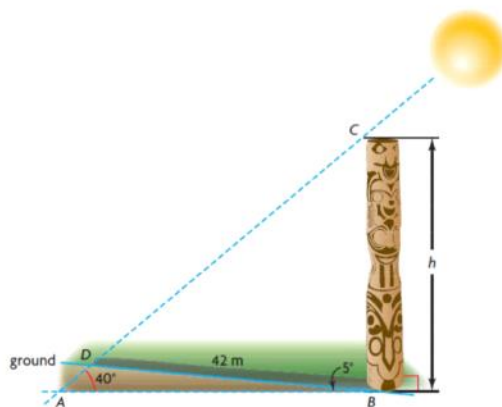
$$y = 196.17$$



The cliff is 196m tall.

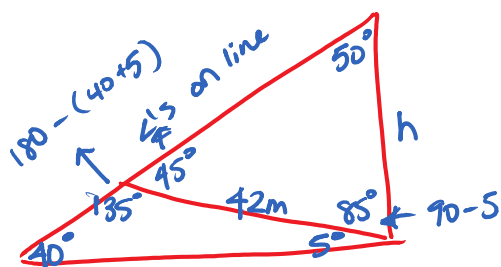


**Example 3:** The world's tallest free-standing totem pole is located in Beacon Hill Park in Victoria, British Columbia. It was carved from a single cedar log by noted carver Chief Mungo Martin of the Kwakiutl (Kwakwaka'wakw), with a team that included his son David and Henry Hunt. It was erected in 1956. While visiting the park, Manuel wanted to determine the height of the totem pole, so he drew a sketch and made some measurements:



- I walked along the shadow of the totem pole and counted 42 paces, estimating each pace was about 1 m.
- I estimated that the **angle of elevation** of the Sun was about  $40^\circ$ .
- I observed that the shadow ran uphill, and I estimated that the angle the hill made with the horizontal was about  $5^\circ$ .

How can Manuel determine the height of the totem pole to the nearest metre?



Use sine Law to find  $h$

$$\frac{h}{\sin 45^\circ} = \frac{42}{\sin 50^\circ}$$

$$h = 38.7686\dots$$

The totem pole is 39 m tall.

Assignment: pg. 147 #3-6, 8, ~~11-14~~ 12

