

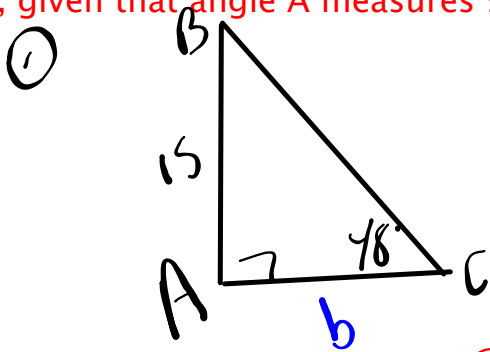
## Warm Up...

1. Sketch the following triangle and find side  $b$ :

$\triangle ABC$ , given that angle A measures  $90^\circ$ , angle C measures  $48^\circ$  and side  $c = 15$  cm.

2. Sketch the following triangle and find the measure of angle B :

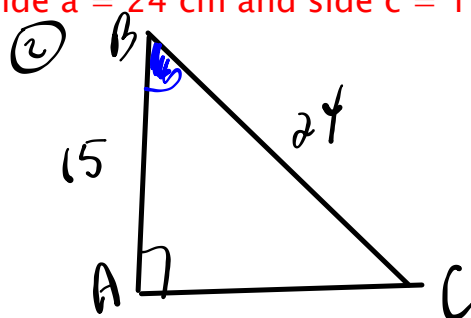
$\triangle ABC$ , given that angle A measures  $90^\circ$ , side  $a = 24$  cm and side  $c = 15$  cm.



$$\tan 48^\circ = \frac{15}{b}$$

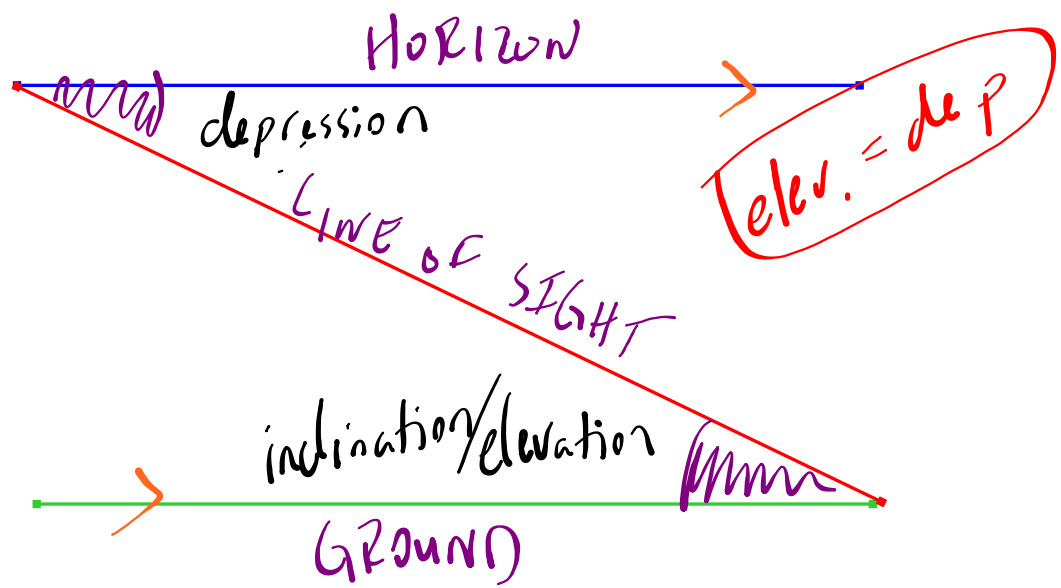
$$b = \frac{15}{\tan 48^\circ}$$

$$b = 13.5 \text{ cm}$$

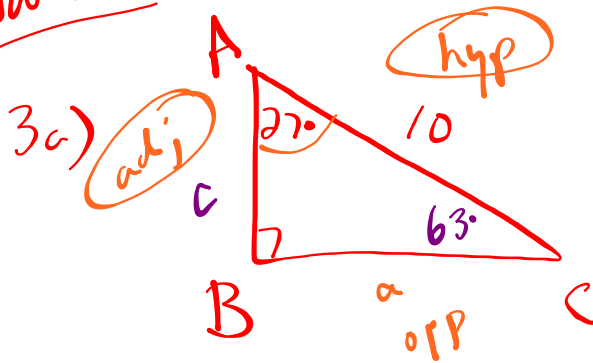


$$\cos^{-1} \left( \frac{15}{24} \right) = \angle B$$

$$\angle B = 39^\circ$$



How ???



$\angle C = 63^\circ$

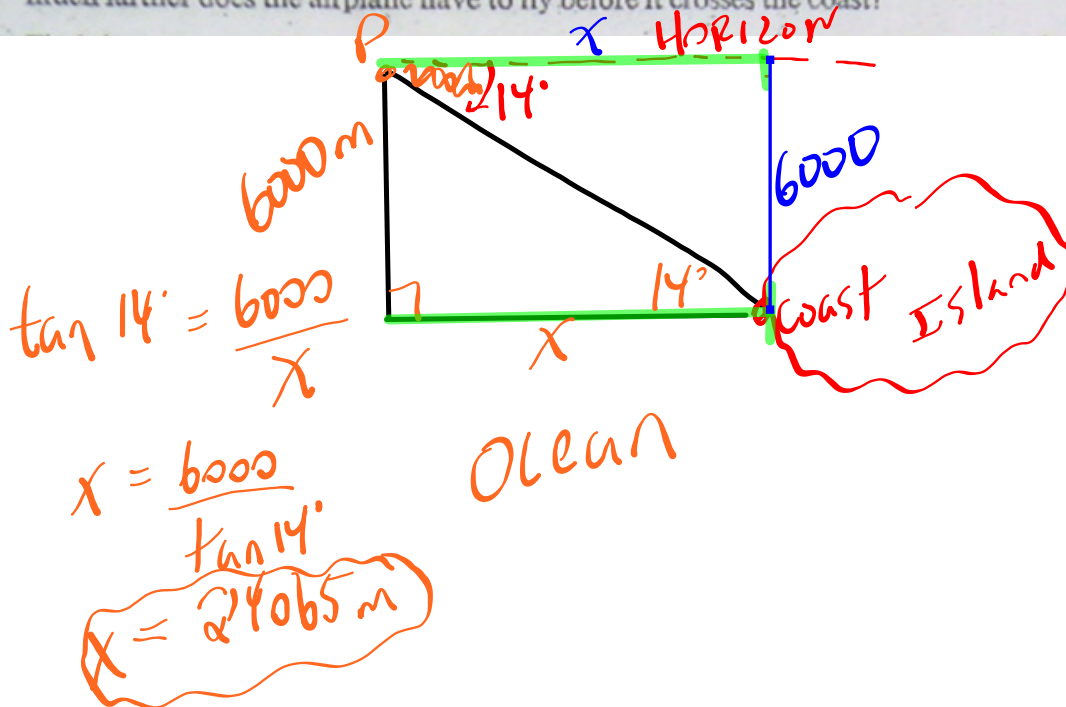
$10 \sin 27^\circ = \frac{a}{10}$  (adj)

$4.5 = a$

$10 \cos 27^\circ = \frac{c}{10}$  (opp)

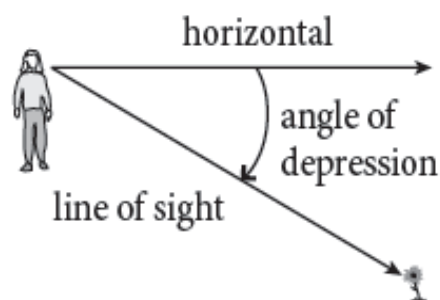
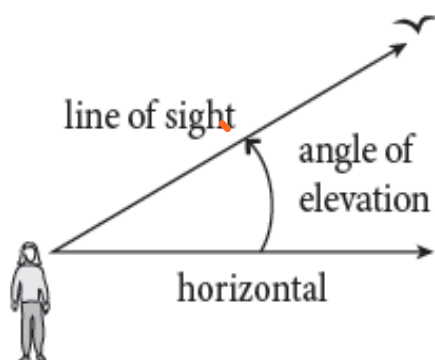
$8.9 = c$

9. An airplane is flying at an altitude of 6000 m over the ocean directly towards an island. When the angle of depression of the coastline from the airplane is  $14^\circ$ , how much farther does the airplane have to fly before it crosses the coast?



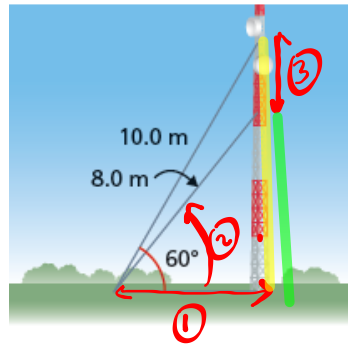
**REMEMBER...**

- An *angle of elevation* is measured from the horizontal upwards.
- An *angle of depression* is measured from the horizontal downwards.



**MORE APPLICATIONS...Example #1:**

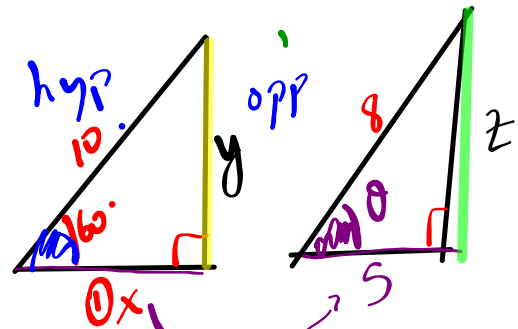
A communications tower has many guy wires supporting it. Two of these guy wires are 10.0 m and 8.0 m long. They are attached at the same point on the ground. The longer wire has an angle of inclination of 60°.



- a) How far from the base of the tower are the wires attached on the ground?
- b) What is the angle of inclination of the shorter guy wire?
- c) How far apart are the points where the guy wires are attached to the tower?

Give the measures to the nearest tenth.

2)  $\cos 60^\circ = \frac{x}{10}$   
 $S = x$   
 5.0 m from the base



b)  $\cos \theta = \frac{5}{8}$

2.7 Solving Problems Involving More than One Right Triangle

3)  $\sin 60^\circ = \frac{y}{10}$   
 $8.66 = y$

$\sin 51^\circ = \frac{z}{8}$   
 $6.2 = z$

$\theta = 51^\circ$

Distance =  $8.66 - 6.2$   
 $= 2.5 \text{ m}$



13. a) 5.0 m      b) 51.3°  
 c) 2.4 m

**EXAMPLE #2:**

An antenna is on the top of the CN Tower in Toronto. From a point 2400 m away, the angles of elevation to the top and bottom of the antenna are 12.1 and 9.9° respectively. How tall is the antenna?

$$\tan 12.1^\circ = \frac{x}{2400}$$

$$2400 \tan 12.1 = x$$

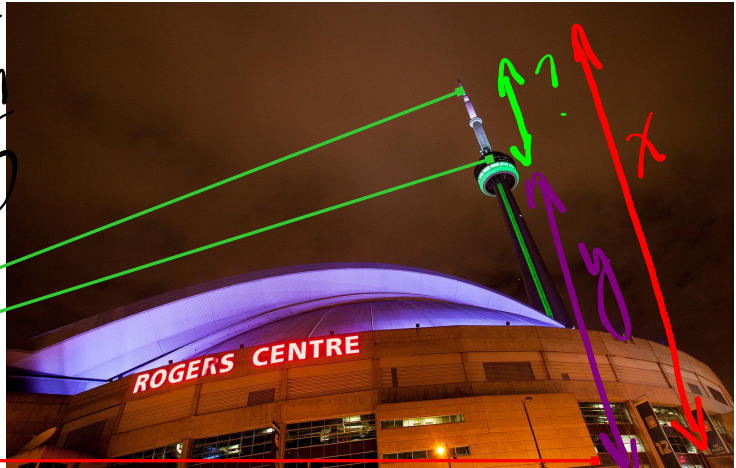
$$514.5 = x$$

$$\tan 9.9^\circ = \frac{y}{2400}$$

$$2400 \tan 9.9 = y$$

$$416.9 = y$$

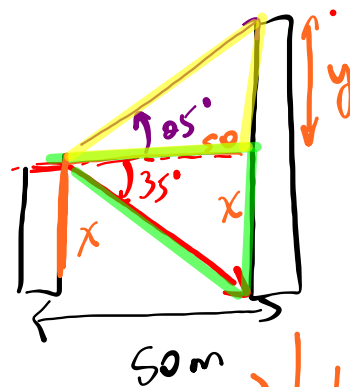
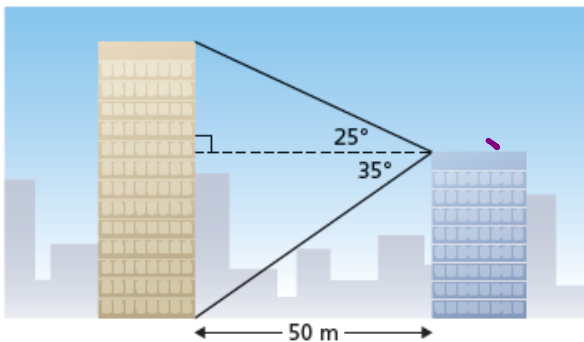
Dist  
= 514.5  
- 416.9  
95.7m



2400 m

**EXAMPLE #2:**

Two office towers are 50 m apart. From the top of the shorter tower, the angle of depression of the base of the taller tower is 35°. The angle of elevation of the top of this tower is 25°. Determine the height of each tower to the nearest metre.



$$\text{So } \tan 35^\circ = \frac{x}{50}$$

$$35\text{m} = x$$
  
 Shorter

$$\tan 25^\circ = \frac{y}{50}$$
  

$$\text{So } \tan 25^\circ = y$$
  

$$23.3 = y$$


Taller  

$$23.3 + 35$$
  

$$58.3\text{m}$$



HOMEWORK... Do # 5 - 11 (omit 8)

 Worksheet - Applications.pdf

## Attachments

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Worksheet - Applications.pdf