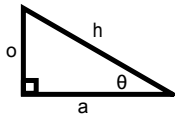
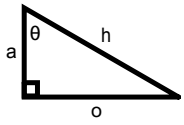
L04 - Math 10C - Multi-Step Triangles (Part 1 - Review)

SohCahToa

$\text{Sin}\,\theta = \frac{\text{opp}}{\text{hyp}}$ $\text{Cos}\,\theta = \frac{\text{adj}}{\text{hyp}}$ $\text{Tan}\,\theta = \frac{\text{opp}}{\text{adj}}$

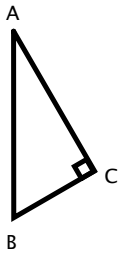




o is the side "opposite" to θ.

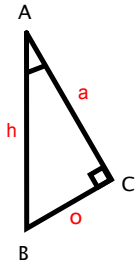
a is the side "adjacent" to θ which connects it to the 90 ° angle.

h is the "hypotenuse", or long diagonal side.



This triangle has the following angles: <A, <B, <C

This triangle has the following sides: AB, BC, AC



If we are solving for <A, label all the sides as "a,o,h" accordingly.

Next, write your Trigonometry ratios.

$$\text{Sin A} = \frac{o}{h} = \frac{BC}{AB}$$

$$\text{Cos A} = \frac{a}{h} = \frac{AC}{AB}$$

$$\text{Tan A} = \frac{o}{a} = \frac{BC}{AC}$$

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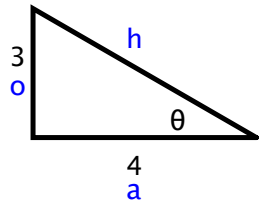
$\text{Sin}\ \theta = \frac{\text{opp}}{\text{hyp}}$ $\text{Cos}\ \theta = \frac{\text{adj}}{\text{hyp}}$ $\text{Tan}\ \theta = \frac{\text{opp}}{\text{adj}}$

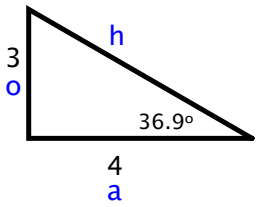


We are going to solve for our angle θ.
We have our opposite (3) and adjacent (4) sides.

$\text{Tan}\ \theta = \frac{o}{a}$ $\text{Tan}\ \theta = \frac{3}{4}$

$\theta = \text{Tan}^{-1}\ (0.75)$

$\theta = 36.9^{o}$



We are going to solve for our hypotenuse (h).
We could do this several ways:

① $\text{Sin}\ \theta = \frac{o}{h}$ ② $\text{Cos}\ \theta = \frac{a}{h}$ ③ Pythagoras Theorem

In this example we will use the first option.

$\text{Sin}\ \theta = \frac{o}{h}$ $\text{Sin}\ 36.9^{o} = \frac{3}{h}$

$0.600 = \frac{3}{h}$

Multiply both sides by h

$0.600h = 3$

Divide both sides by 0.600

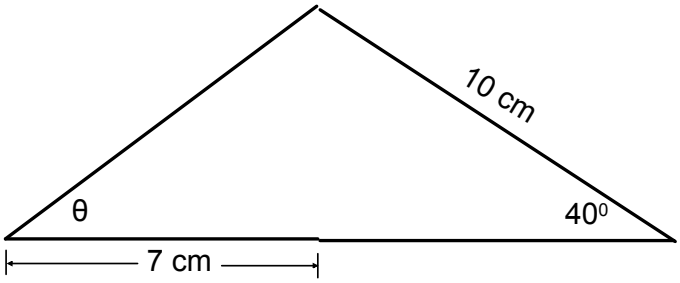
$h = \frac{3}{0.600}$

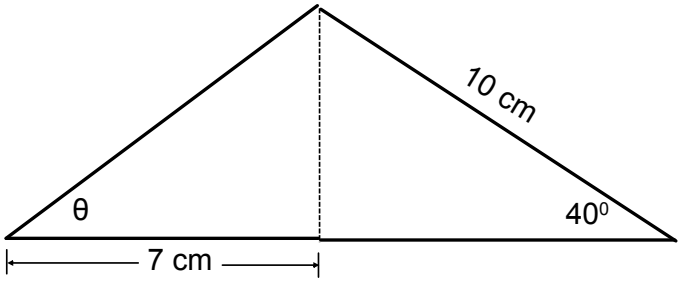
$h = 5$

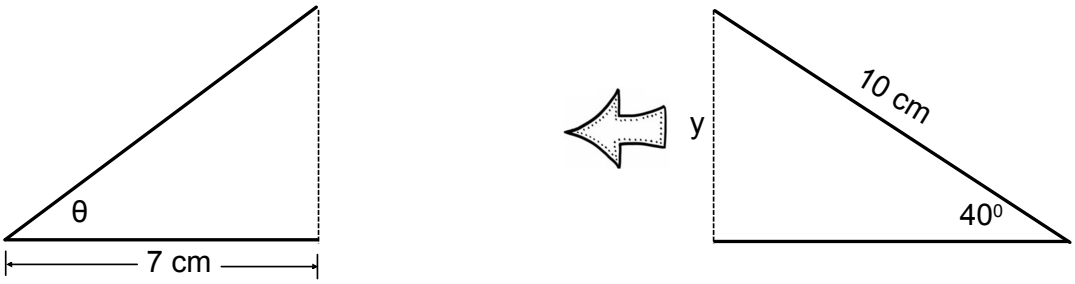
The hypotenuse (h) is 5 units long.

Part 2 – Multi-Step Triangles

How do we find the measure of the missing angle, , in degrees.







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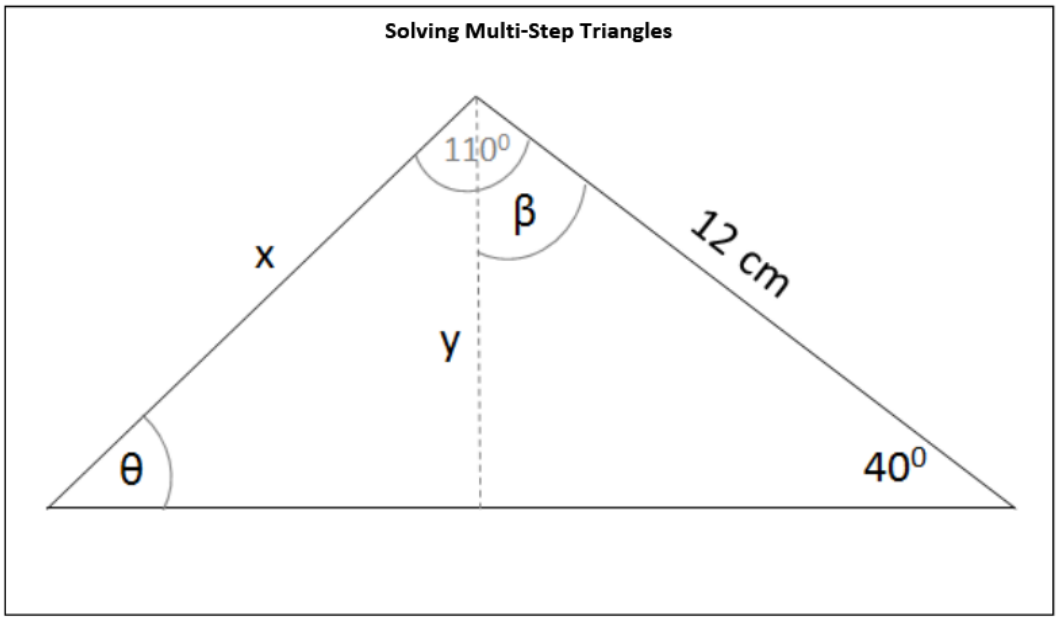
Use the following information to answer Q1-4:



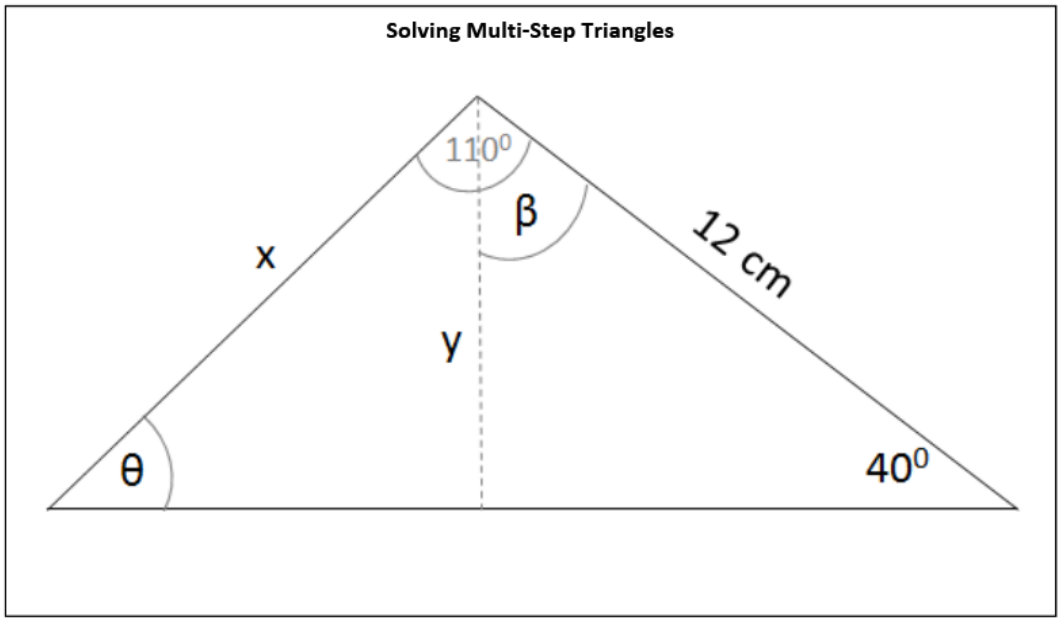
Q1: What is the value of β, to the nearest degree?

(Record your answer in the Numerical Response boxes below)

Q2: The value of θ is ***a.bc*** x 10^{d}, where ***a, b, c,*** and ***d*** are ___, ___, ___, and ___.

*(Record your **four digit** answer in the Numerical Response boxes below)*

Use the following information to answer Q1-4:



Q3: What is the value of y?

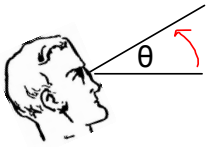
*(Record your **three digit** answer in the Numerical Response boxes below)*

Q4: What is the value of x, to the nearest tenth?

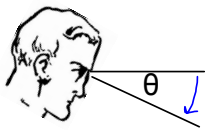
(Record your answer in the Numerical Response boxes below)

Part 3 – Word Problems

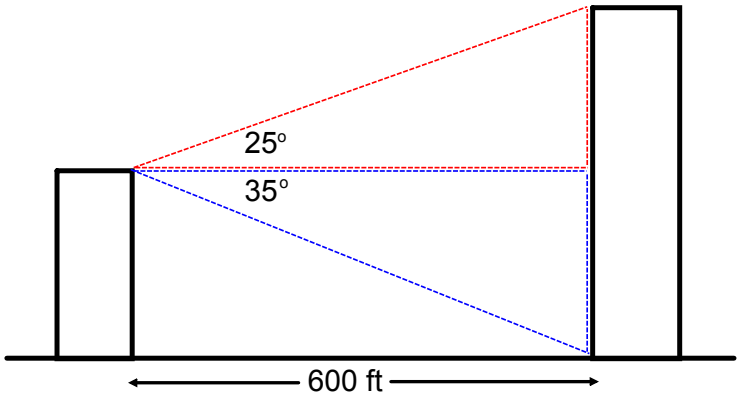
Angle of Elevation (Inclination)



Angle of Depression (Declination)



How do we find the height of each building?



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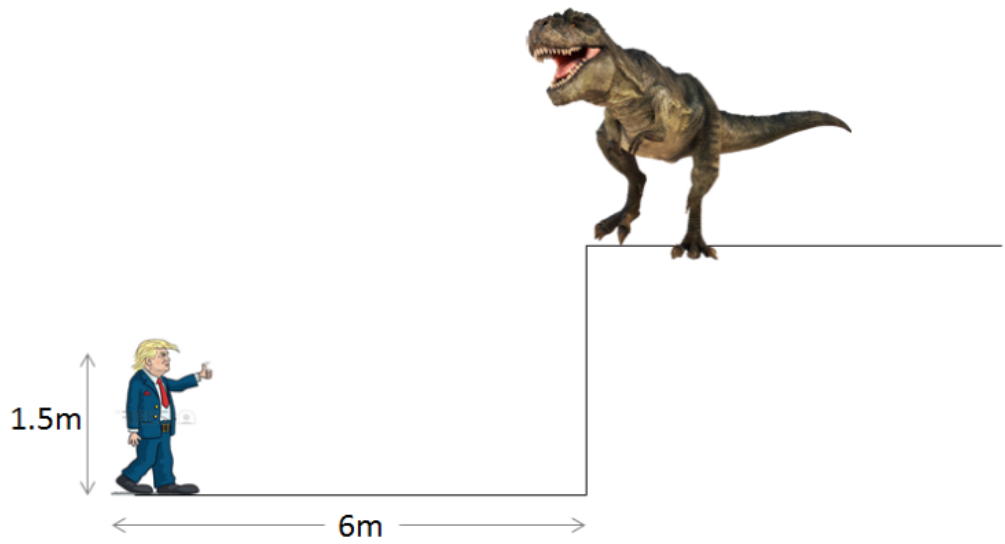
Use the following information to answer Q5-Q6:

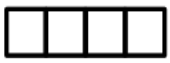
Measuring the Height of a Dinosaur



Mr. Trump sees a dinosaur on a nearby cliff. He measures the angle of elevation to the top of the cliff to be 10^0. The angle of elevation to the top of the dinosaur is 35^0.

Q5: What is the height of the dinosaur, in meters?

*(Record your **three digit** answer in the Numerical Response boxes below)*



Use the following information to answer Q5-Q6:

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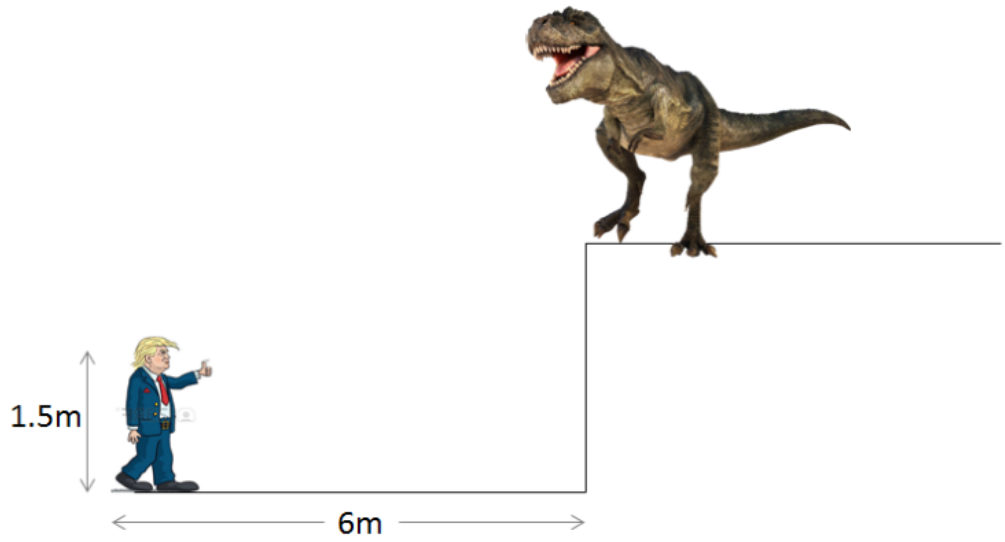

Mr. Trump sees a dinosaur on a nearby cliff. He measures the angle of elevation to the top of the cliff to be 10^0. The angle of elevation to the top of the dinosaur is 35^0.

Q6: What is the height of the cliff, in meters?

*(Record your **three digit** answer in the Numerical Response boxes below)*