

Warm Up

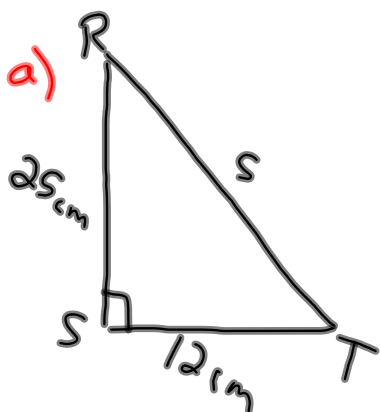
1. Evaluate each of the following:

(a) $\csc A = 1.1924$
 $A = \underline{57^\circ}$

(b) $\sec 168^\circ = \underline{-1.0223}$

2. Solve the following triangles:

(a) $\triangle RST$, given that $S = 90^\circ$, $r = 12$ cm and $t = 25$ cm.

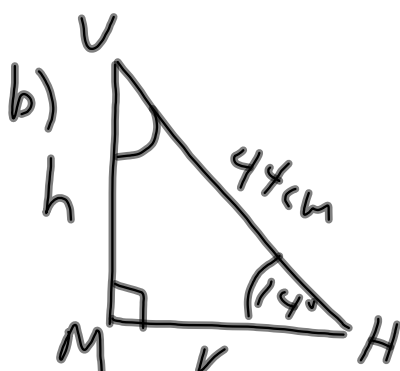


$$s^2 = 25^2 + 12^2$$

$$s = \underline{27.7 \text{ cm}}$$

$$\tan T = \frac{25}{12}$$

$$T = 64^\circ \quad \therefore R = 26^\circ$$



$$\angle V = 76^\circ$$

$$\cos 14^\circ = \frac{v}{44}$$

$$v = 44 \cos 14^\circ$$

$$v = \underline{42.7 \text{ cm}}$$

$$\sin 14^\circ = \frac{h}{44}$$

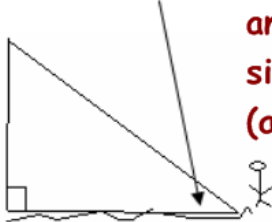
$$h = 44 \sin 14^\circ$$

$$h = \underline{10.6 \text{ cm}}$$

Applications of Right Angle Trigonometry

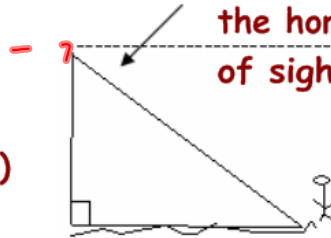
ANGLE OF ELEVATION/DEPRESSION

Angle of elevation - is the angle between the ground and the line of sight. (angle of inclination)



Always from the GROUND up

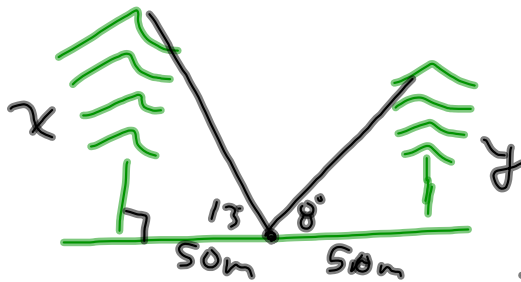
Angle of Depression - is the angle between the horizon and the line of sight.



Always outside the triangle

Example 1:

Two trees are 100m apart. From a point on midway between them, the angles of elevation to their tops are 8° and 13° . How much taller is one tree than the other?



$$\tan 13^\circ = \frac{x}{50}$$

$$x = 50 \tan 13^\circ$$

$$x = 11.5m$$

4.5m taller

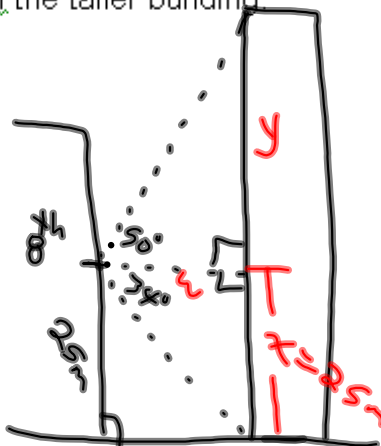
$$\tan 8^\circ = \frac{y}{50}$$

$$y = 50 \tan 8^\circ$$

$$y = 7m$$

Example 2:

The 8th floor of an apartment building is 25m above the ground. From the 8th floor, the angle of elevation to the top of the other building is 50° . The angle of depression to the base of the taller building is 34° . Determine the height of the taller building.



$$\tan 34^\circ = \frac{25}{w}$$

$$w = \frac{25}{\tan 34^\circ}$$

$$w = \underline{\underline{37.1m}}$$

$$\tan 50^\circ = \frac{y}{37.1}$$

$$y = \left(\frac{25}{\tan 34^\circ} \right) \tan 50^\circ$$

$$y = \underline{\underline{44.2m}}$$

Building height = 69.2m

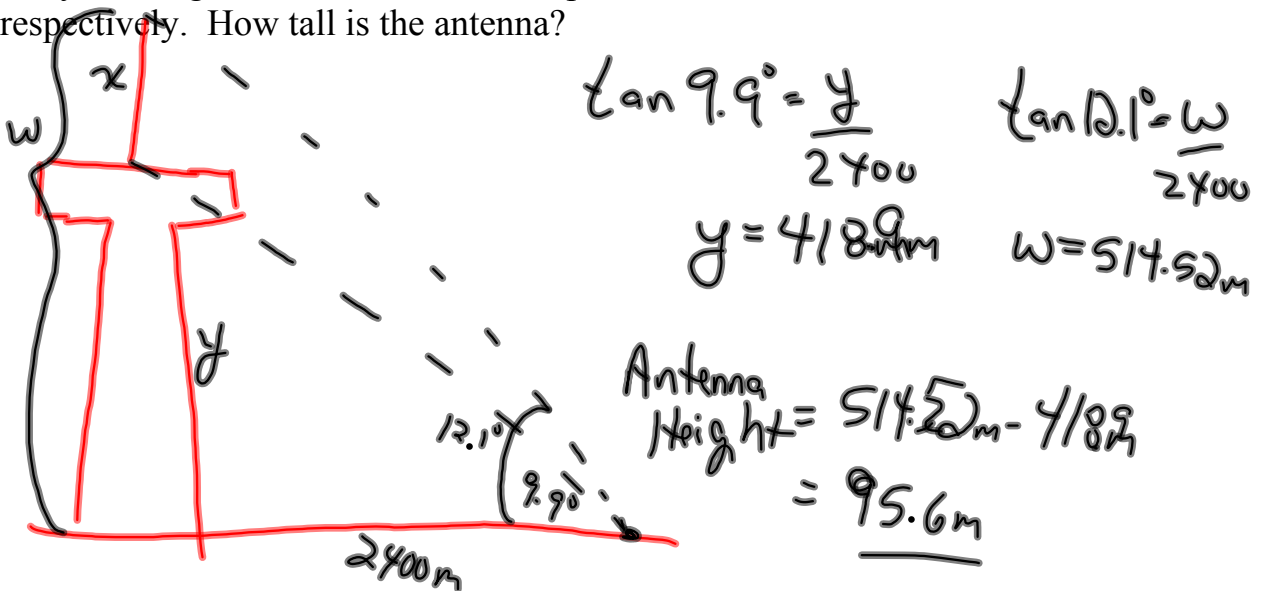
Applications of Trig Ratios

Examples...

#1. The Goodyear Blimp is 565 m above the ground during a Super Bowl game. The angle of depression of the north goal line from the blimp is 58.5° . How far is the observer in the blimp from the goal line?



#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?



Law of Sines

** Used when the triangle does not contain 90° angle (**Oblique Triangle**)

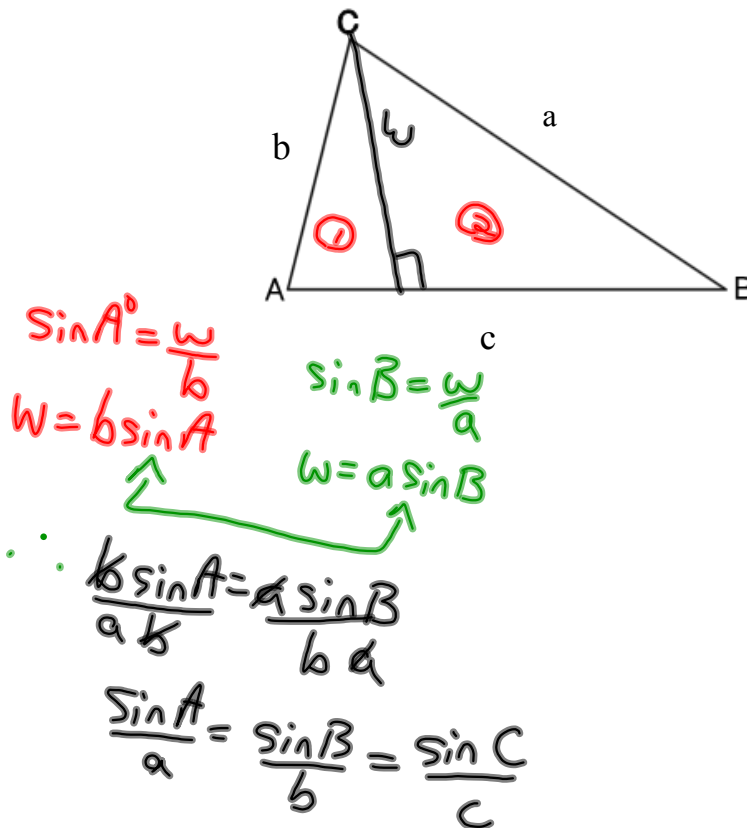
** In order to use you must be given 1) an angle and an opposite side
AND

2) any other side or angle

Lower case letters "a,b,c" represent side lengths

Upper case letters "A,B,C" represent angle measures

Let's derive the Law of Sines...



Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$



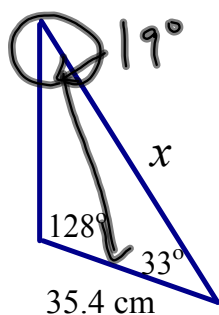
"when looking for a side"

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$



"when looking for an angle"

EXAMPLE #1 - Finding a side.



$$\frac{35.4}{\sin 19^\circ} = \frac{x}{\sin 28^\circ}$$

$$x = \frac{35.4}{\sin 19^\circ} (\sin 28^\circ)$$

$$x = \underline{\underline{85.7 \text{ cm}}}$$

EXAMPLE #2 - Finding an angle.

