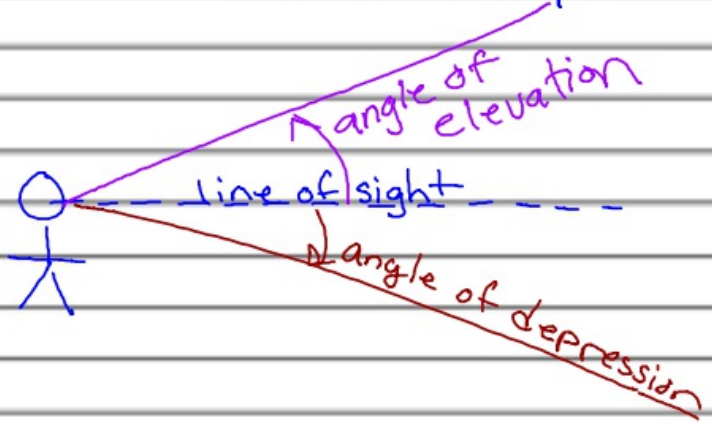
Cornell Notes	Topic/Objective: Applications of Right Triangles	Name:
		Class/Period: 4
		Date: 9/20/16

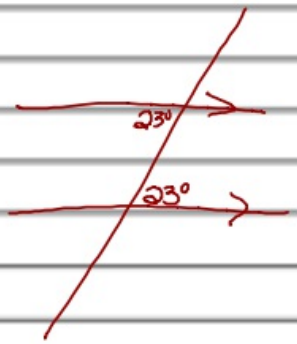
Essential Question: What are some applications for right Triangles?

Questions:	Notes:

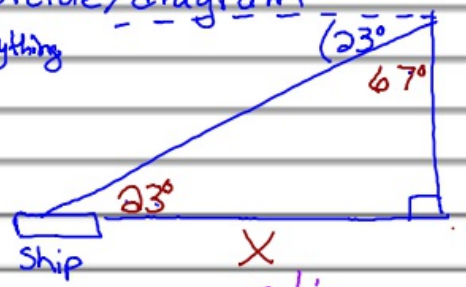
Angles of Inclination / Declination
Elevation / Depression



Ex) From the top of a 200ft lighthouse, the angle of depression to the sea is 23 degrees down to a ship. How far is the ship from the base of the lighthouse?



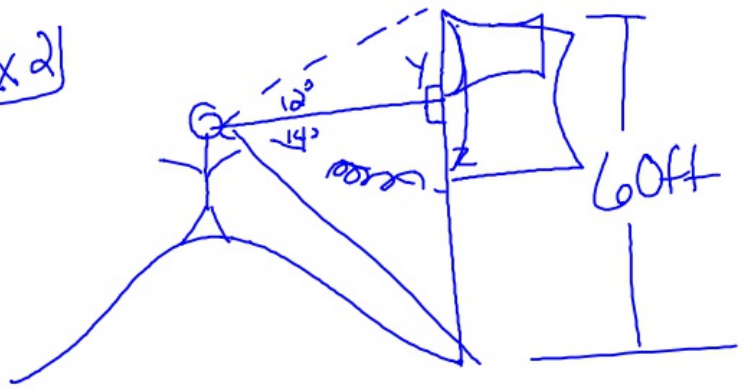
* Draw a picture/diagram
* Assume everything is level



$$\tan(23^\circ) = \frac{\text{adj}}{\text{opp}} = \frac{200}{x}$$

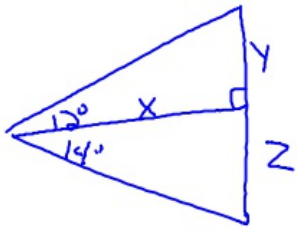
$$x = \frac{200}{\tan 23^\circ} \approx 471 \text{ ft.}$$

Ex 2)



Y =

Z =



$Y + Z = 60\text{ft}$

$\tan 12^\circ = \frac{Y}{X}$ $\quad X\tan 12^\circ = Y$

$\tan 14^\circ = \frac{Z}{X}$ $\quad X\tan 14^\circ = Z$

2x + 2y

2(x + y)

$X\tan 12^\circ + X\tan 14^\circ = 60$

$X(\tan 12^\circ + \tan 14^\circ) = 60$

$\frac{X(\tan 12^\circ + \tan 14^\circ)}{\tan 12^\circ + \tan 14^\circ} = \frac{60}{\tan 12^\circ + \tan 14^\circ}$

$\sin(\theta+\beta) = \sin\theta\cos\beta + \cos\theta\sin\theta$

$\tan(\alpha+\beta) = \frac{1-\cos^2\alpha}{}$

$X \approx 130\text{ft}$

$Y \approx 27.4$ $\quad Y = \tan(8^\circ)(129.0558274)$

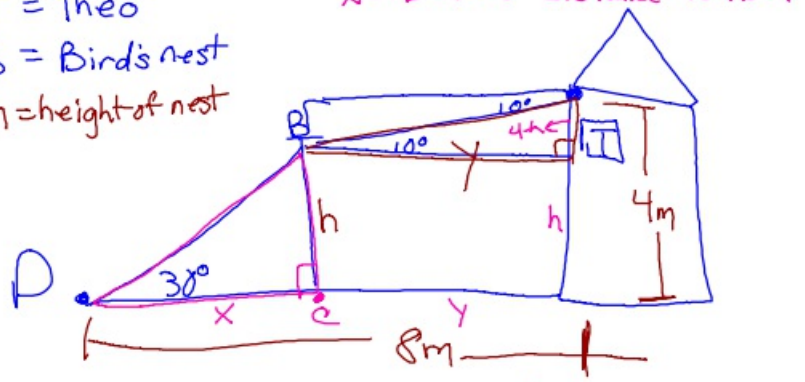
$Z \approx$ $\quad Z = (129.0558274)\tan(14^\circ)$

Sample Exam Question

Daniel and Theo are trying to work out the height of a bird's nest in their garden. From Theo's bedroom window, which is 4m above the ground, the angle of depression of the nest is 10 degrees. From Daniel's position at the end of the garden, 8m away from the house, the angle of elevation in 30 degrees. Find the height of the nest above the ground.

D = Daniel's position
T = Theo
B = Bird's nest
h = height of nest

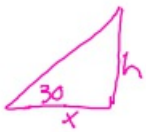
y = Theo's distance to nest
x = Daniel's distance to nest

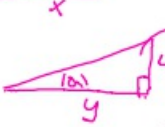


$x + y = 8$

$\tan 30° = \frac{h}{x}$

$x = \frac{h}{\tan 30°}$





$\tan(10) = \frac{4-h}{y}$

$y = \frac{4-h}{\tan(10)}$

$\tan 80° = \frac{y}{4-h}$

$y = \tan 80°(4-h)$

$$\frac{\tan(10)}{\tan(10)\cdot\tan 30°}\cdot h + \frac{(4-h)}{\tan(10)}\cdot\frac{\tan(30)}{\tan(30)} = 8$$

$$\frac{h\cdot\tan(10) + 4\tan(30) - h\tan(30)}{\tan(30°)\tan(10)°} = 8(\tan 30\tan 10)$$

$h\tan(10) - h\tan(30) + 4\tan 30 =$

$h\tan(10) - h\tan(30) = 8(\tan 30\tan 10) - 4\tan 30$

$$h\frac{(\tan(10) - \tan(30))}{(\tan(10) - \tan(30))} = \frac{8(\tan 30\tan 10) - 4\tan 30}{(\tan(10) - \tan(30°))}$$