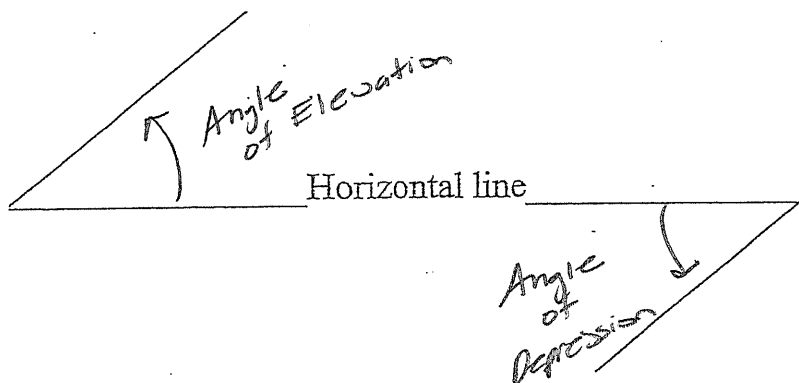


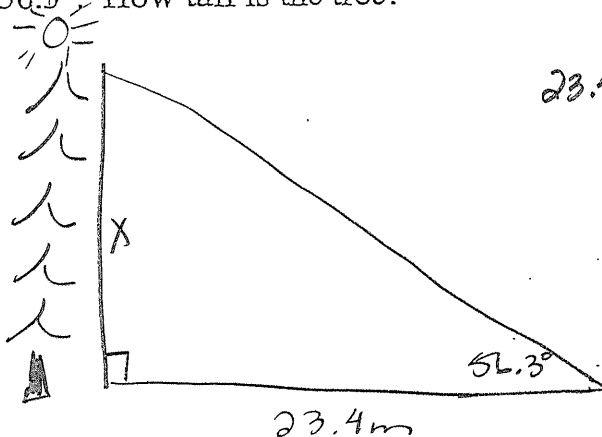
Angle of Elevation – an angle measured from the horizontal, upward

Angle of Depression – an angle measured from the horizontal, downward



Ex. #1

The horizontal shadow of a vertical tree is 23.4 m long when the angle of elevation of the sun is 56.3° . How tall is the tree?

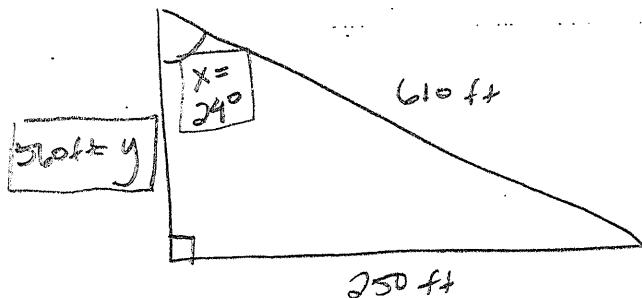


$$23.4 (\tan 56.3^\circ) = \left(\frac{x}{23.4m} \right) 23.4$$

$$x = 35.1m$$

Ex. #2

A radio station antenna is supported by wire cables, which are attached to the top of the antenna. The points where the cables are anchored to the ground are 250 ft away from the antenna. If the cables are 610 ft long, find the measure of the angles formed by the antenna and the cables, and the height of the antenna.



$$\sin^{-1} \left(\frac{250}{610} \right) = \boxed{24^\circ = x}$$

* nearest degree

$$y^2 + 250^2 = 610^2$$

$$- 250^2 \quad - 250^2$$

$$\sqrt{y^2} = \sqrt{309600}$$

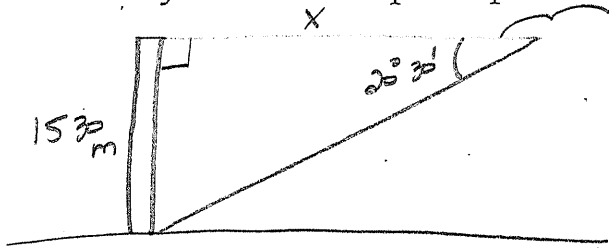
$$y = 556.417$$

* 2 sig. dig

$$556.417$$

Ex. #3

A bird is flying at an elevation of 1530 m. The angle of depression from the bird to the bottom of a telephone pole is $20^\circ 30'$. What is the horizontal distance from the bird to a point directly above the telephone pole?



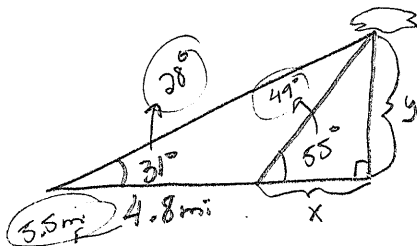
$$\frac{\tan 20^\circ 30'}{1} = \frac{1530}{X}$$

$$\frac{\tan 20^\circ 30' X}{\tan 20^\circ 30'} = \frac{1530}{\tan 20^\circ 30'}$$

$$X = 4090 \text{ m}$$

$$4092.17$$

*Example 4, p.34 and Matched Problem 4



$$\tan 55^\circ = \frac{y}{x} \rightarrow y = x \tan 55^\circ$$

$$\tan 31^\circ = \frac{y}{4.8 + x}$$

$$4.8 + x (\tan 31^\circ) = \left(\frac{x \tan 55^\circ}{4.8 + x} \right) (4.8 + x)$$

$$(\tan 31^\circ)(4.8) + x \tan 31^\circ = x \tan 55^\circ$$

$$2.884 + x \tan 31^\circ = x \tan 55^\circ$$

$$- x \tan 31^\circ \quad - x \tan 31^\circ$$

$$2.884 = x \tan 55^\circ - x \tan 31^\circ$$

$$2.884 = x (\tan 55^\circ - \tan 31^\circ)$$

$$2.884 = \frac{0.8273 X}{0.8273}$$

$$0.8273 \quad 0.8273$$

$$X = 3.486$$

$$y = 3.486 (\tan 55^\circ)$$

Matched 4 || $y = 5.6 \text{ mi}$

$$\tan 49^\circ = \frac{y}{x} \rightarrow y = x \tan 49^\circ$$

$$5.5 + x (\tan 28^\circ) = \left(\frac{y}{5.5 + x} \right) (5.5 + x)$$

$$5.5 (\tan 28^\circ) + x \tan 28^\circ = y$$

$$2.9244 + x \tan 28^\circ = x \tan 49^\circ$$

$$- x \tan 28^\circ \quad - x \tan 28^\circ$$

$$2.9244 = x (\tan 49^\circ - \tan 28^\circ)$$

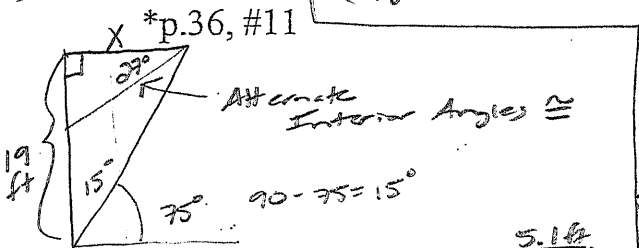
$$2.9244 = \frac{0.6187 X}{0.6187}$$

$$0.6187 \quad 0.6187$$

$$X = 4.727$$

$$y = 4.727 (\tan 49^\circ)$$

$$y = 5.4 \text{ mi}$$



$$19 (\tan 15^\circ) = \left(\frac{x}{19} \right) 19$$

$$X = 5.1 \text{ ft}$$

$$5.1 (\tan 28^\circ) = \left(\frac{y}{5.1} \right) 5.1$$

$$y = 2.6 \text{ ft}$$