

Sec. 4.8

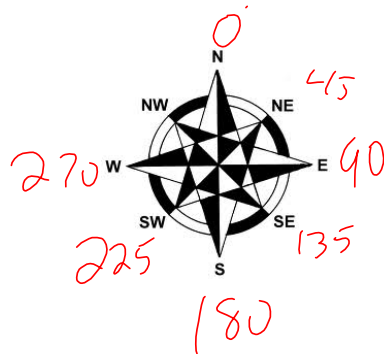
Applications of Trigonometry

General Steps to Follow

- identify the question being asked
- if possible, draw a picture (usually will be a right triangle)
- identify the proper trig. function that relates the given information
- with "regular" trig. functions, you plug in an angle to equal a ratio
- with inverse trig. functions, you plug in a ratio to equal an angle

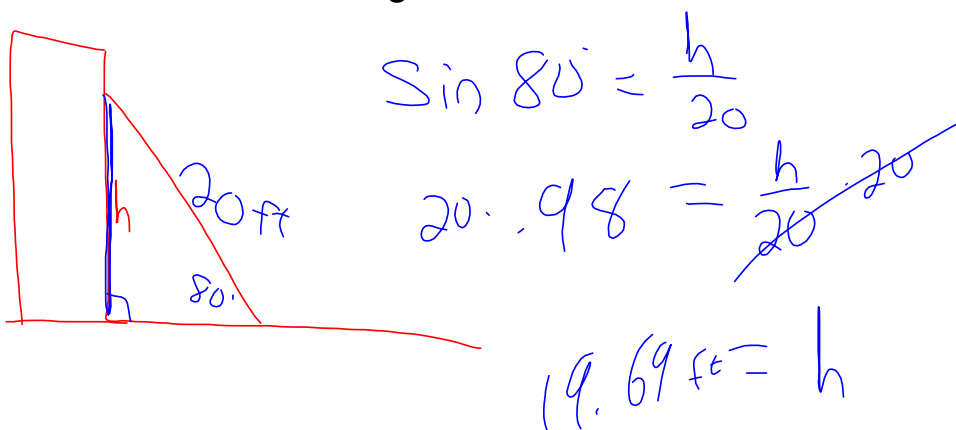
Terminology

- *angle of elevation* - the angle going up from the horizontal
- *angle of depression* - the angle going down from the horizontal
- *bearing or heading* - the direction of travel. Due North is 0 degrees, due East is 90 degree, ...



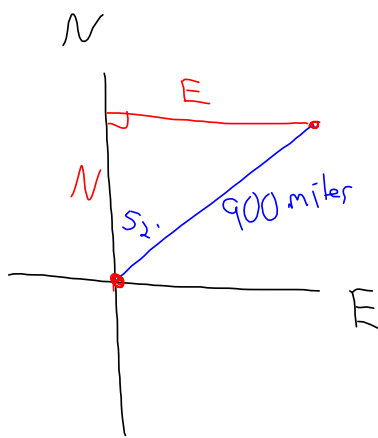
Example

A 20 foot ladder is leaning against the side of a building. The angle of elevation of the ladder is 80 degrees. What is the height from the top of the ladder to the ground?



Example

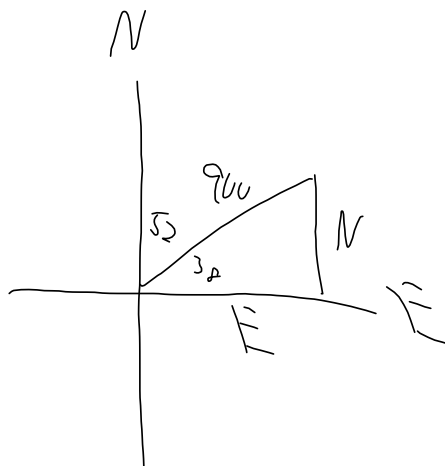
An airplane flying at 600 MPH has a bearing of 52 degrees. After flying for 1.5 hours, how far north and how far east has the plane traveled from its starting point?



$$900 \cdot \cos 52^\circ = \frac{N}{900} \cdot 900$$

$$900 \cdot \cos 52^\circ = N = 554.09 \text{ miles}$$

$$\sin 52^\circ = \frac{E}{900} \rightarrow E = 709.29 \text{ miles}$$



$$\sec^{-1}(\sqrt{2}) = \theta = \frac{\pi}{4}$$

$$\sec \theta = \sqrt{2}$$

$$\frac{1}{\cos \theta} = \frac{\sqrt{2}}{1}$$

$$\cos \theta = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$