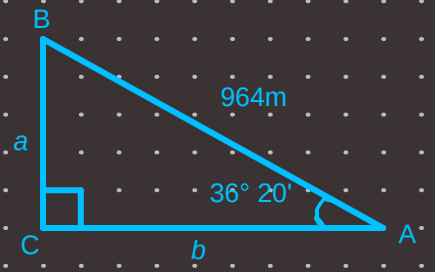
13.) *Solve each right triangle. When two sides are given, give angles in degrees and minutes.*



$S\frac{o}{h}$ $C\frac{a}{h}$ $T\frac{o}{a}$

$\sin 36^\circ 20' = \frac{a}{964m}$

$964m(\sin 36^\circ 20') = a$

$a = 571.15m$

$\cos 36^\circ 20' = \frac{b}{964m}$

$964m(\sin 36^\circ 20') = b$

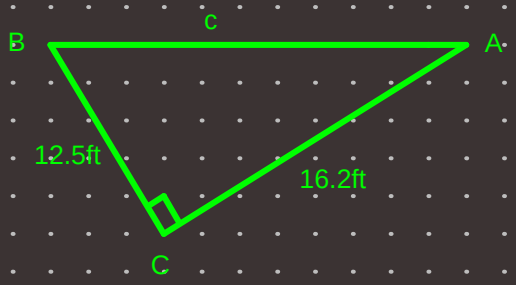
$b = 776.58m$

$B = C - A$

$B = 90 - 36^\circ 20'$

$B = 53^\circ 40'$

19.)



$c = \sqrt{16.2^2 + 12.5^2}$

$c = \sqrt{262.44 + 156.25}$

$c = \sqrt{418.69}$

$c = 20.46ft$

$\sin A = \frac{12.5ft}{20.46ft}$

$\sin^{-1} A = 37.66^\circ = A$

$B = C - A = 90^\circ - 37.66^\circ = 52.34^\circ$

$= .34 \cdot 60 = 20.4$

$= .4 \cdot 60 = 24$

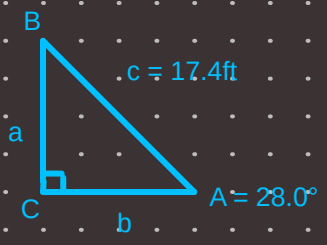
$= 52^\circ 20' 24'' = B$

$.66 \cdot 60 = 39.6$

$= .6 \cdot 60 = 34$

$= 37^\circ 39' 34''$

25.) Solve each right triangle. In each case, C = 90°. If angle information is given in degrees and minutes, give answers in the same way. If angle information is given in decimal degrees, do likewise in answers. When two sides are given, give angles in degrees and minutes.



$90 - 28 = 62° = B$

$\sin 28 = \frac{a\,ft}{17.4\,ft}$

$17.4(\sin 28) = a$

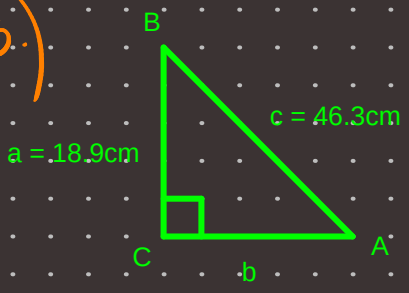
$a = 8.17\,ft$

$\cos 28 = \frac{b}{17.4\,ft}$

$17.4(\cos 28) = b$

$b = 15.36\,ft$

35.)



$\sin A = \frac{18.9\,cm}{46.3\,cm}$

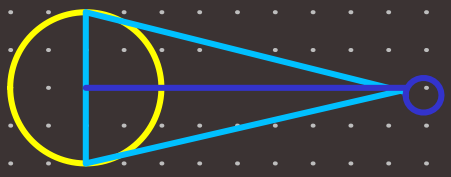
$\sin^{-1} A = 24.1°$

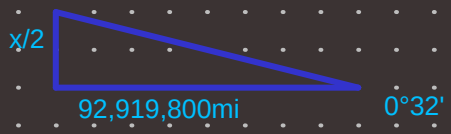
$B = C - A = 90 - 24.1° = 65.9°$

$\cos 24.1 = \frac{b}{46.3\,cm}$

$46.3(\cos 24.1) = 42.26\,ft$

48.) To determine the diameter of the sun, an astronomer might sight with a transit (a device used by surveyors for measuring angles) first to one edge of the sun and then to the other, estimating that the included angle equals 32'. Assuming that the distance d from Earth to the sun is 92,919,800mi, approximate the diameter of the sun.



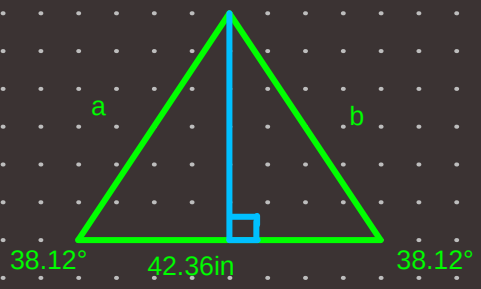


$\tan 32' = \frac{x}{92,919,800mi}$

$92,919,800 \tan 32' = x$

$x = 864,961.76mi$ = Diameter of Sol

49.) The length of the side of the base of an isosceles triangle is 42.36in. Each base angle is 38.12°. Find the length of each of the two equal sides of the triangle. (Hint: Divide the triangle into two right triangles)

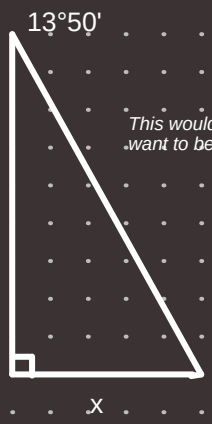


$\cos 38.12° = \frac{\frac{42.36}{2}}{b}$

$\frac{42.36}{2} \cos 38.12 = b = a$

$a = b = 16.64in$

54.) An airplane is flying 10,500ft above level ground. The angle of depression from the plane to the base of a tree is 13°50'. How far horizontally must the plane fly to be directly over the tree?



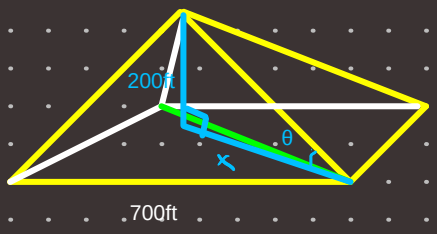
This would be a very aggressive descent, would not want to be on this plane

$$\cos 13°50' = \frac{x}{10.5\text{kft}}$$

$$10{,}500 \cos 13°50' = x$$

$$x = 10{,}195.45\text{ft}$$

59.) The Pyramid of the Sun is in the ancient Mexican city of Teotihuacan. The base is a square with sides about 700ft long. The height of the pyramid is about 200ft long. Find the angle of elevation θ of the edge indicated in the figure to two significant digits. (Hint: The base of the triangle in the figure is half the diagonal of the square base of the pyramid).



$$x = \sqrt{700^2 + 700^2}$$

$$x = 989.95\text{ft}$$

$$\frac{x}{2} = 494.97\text{ft}$$

$$\tan\theta = \frac{200\text{ft}}{494.97\text{ft}}$$

$$\tan^{-1}\theta = 22°$$