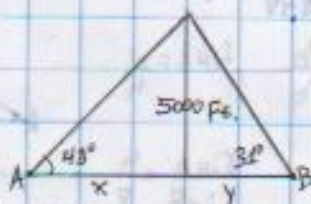


8. two observers at A and B sight an airplane simultaneously, when its altitude is 5000 feet. The angles of elevation at A and B are 43° and 31° , respectively. Find the distance from A to B. Assume $\cot 43^\circ = 1.0724$, $\cot 31^\circ = 1.6643$.

$$h^2 = x^2 + 5000^2 \quad \sin^2 A + \cos^2 A = 1$$

$$\tan A = \frac{5000}{x} \quad \frac{43^\circ}{180} = \frac{5000(180)}{43^\circ x}$$



$$43^\circ \times \frac{\pi}{180} \approx 0.750491578 \times 5000 = 3752.4579$$

$$43^\circ \times \frac{\pi}{180} = 0.750491578$$

$$\tan(x) = 0.932515086$$

$$\tan 43^\circ = \frac{5000}{x} = x \tan 43^\circ = 5000 \quad \frac{5000}{\tan(43^\circ)} = \frac{5000}{0.932515086}$$

$$x = 5361.84355 \text{ ft} \quad \tan 31^\circ = 0.600860619 = \frac{5000}{y}$$

$$\frac{5000}{0.600860619} = 8320.976 \quad \cot 43^\circ = \frac{1}{\tan 43^\circ} = 1.07236371$$

$$\cot 31^\circ = \frac{1}{\tan 31^\circ} = 1.66427948 \quad \tan B = \frac{5000}{y} = \frac{5000}{8320.976}$$

\cot é a operação inversa de \tan

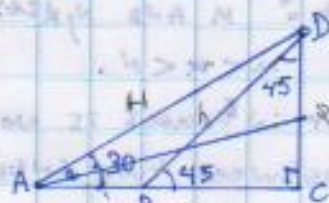
Use $\tan = \frac{y}{x}$
L $\cot = x$

$$x = 5000 \cot 43^\circ = 5361.84355 \quad y = 5000 \cot 31^\circ = 8320.976$$

9. DC represents a building. The angles of elevation at A and B are 30° and 45° as shown. If AB is 150 feet, how high is the building? The functions of 30° and 45° are given in article 60.

$$\sin(30^\circ) = \frac{1}{2} \quad DC = 1 \quad H = 2$$

$$\cos(30^\circ) = \frac{150 \text{ ft}}{H} \quad H = \frac{150 \text{ ft}}{\cos 30^\circ}$$



$$H = \frac{150 \text{ ft}}{\left(\frac{\sqrt{3}}{2}\right)} \approx 173.205081 \text{ ft} \quad \sin A = \frac{h}{H} \quad H \sin A = h$$

$$h^2 = h^2 + AB^2 = 150^2 + 86.6^2$$

$$h = 173.205081 \left(\frac{\sqrt{2}}{2}\right) = 86.6025400 \text{ ft} \quad \sin B = \frac{DC}{h}$$

$$DC = h(\sin B) = 86.6025400 \left(\frac{\sqrt{2}}{2}\right) = 122.474487 \text{ ft}$$

$$* H \sin B = 86.6025400 \left(\frac{\sqrt{2}}{2}\right)$$

$$BD^2 = AB^2 + DC^2$$

THE BUILDING IS 122.474487 ft HIGH.

$$\text{CHECKING: } \cos B = \frac{BC}{h} \quad BC = h \cos B \quad BC = 61.2372433$$

$$h^2 = a^2 + b^2 \quad AB + BC = T = 147.339723$$

$$\tan 30^\circ = \frac{DC}{150 \text{ ft}} \quad h = \frac{DC}{\tan 30^\circ} = \frac{122.474487}{\tan 30^\circ} = 173.205081$$

$$\sin 30^\circ = \frac{h}{H} = \frac{86.6}{H} \quad H = \frac{h}{\sin 30^\circ}$$

$$H = 173.205081 \text{ ft}$$

$$\cos B = \frac{T}{h} \quad T = h \cos B \quad T = 61.2372436$$

2/20/12