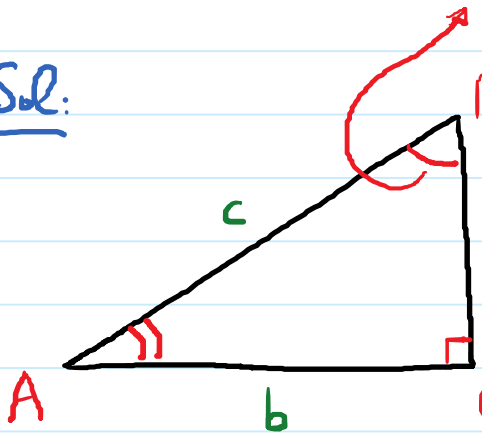
2.4. Solve Right Triangles

Tuesday, February 5, 2019 8:31 AM

E.g.1 Solve right triangle ABC

Given $B = 28^\circ 40'$; $a = 25.3$.

Sol:



Need: A, b, c

$$A = 90^\circ - 28^\circ 40'$$

$$= 89^\circ 60' - 28^\circ 40'$$

$$\boxed{A = 61^\circ 20'}$$

$$\boxed{\tan B} = \frac{b}{\boxed{a}} \longrightarrow b = a \tan B$$

$$b = 25.3 \tan\left(28^\circ + \frac{40^\circ}{60}\right)$$

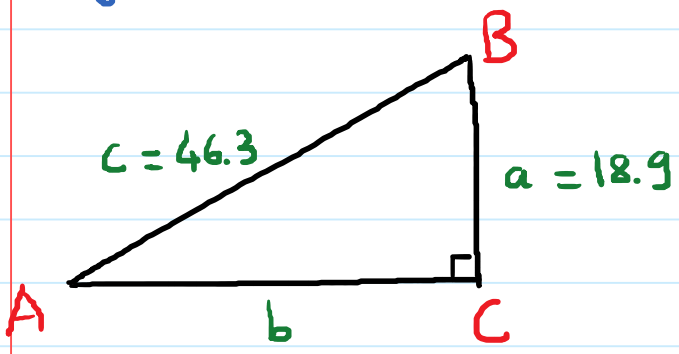
$$\boxed{b \simeq 13.832}$$

$$\cos B = \frac{a}{c} \longrightarrow c \cdot \cos B = a$$

$$\longrightarrow c = \frac{a}{\cos B} = \frac{25.3}{\cos\left(28^\circ + \frac{40^\circ}{60}\right)}$$

$$\boxed{c \simeq 28.834}$$

E.g. Given $a = 18.9$; $c = 46.3$.



Need: A, B, b.

$$a^2 + b^2 = c^2 \rightarrow b = \sqrt{c^2 - a^2}$$

$$b = \sqrt{(46.3)^2 - (18.9)^2} \simeq 42.267$$

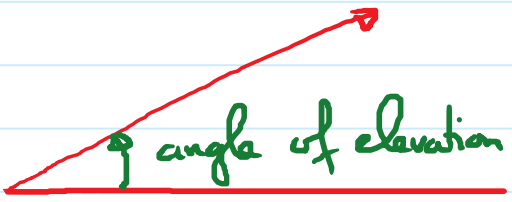
$$\cos B = \frac{a}{c} = \frac{18.9}{46.3} \rightarrow B = \cos^{-1}\left(\frac{18.9}{46.3}\right)$$

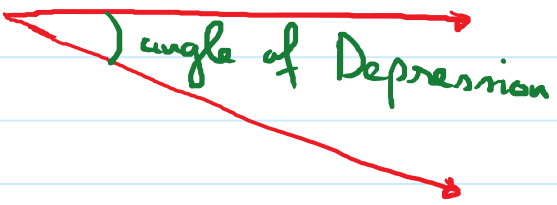
$$B \simeq 65.908^\circ$$

$$\sin A = \frac{a}{c} = \frac{18.9}{46.3} \rightarrow A = \sin^{-1}\left(\frac{18.9}{46.3}\right)$$

$$A \simeq 24.092^\circ$$

Angle of Depression and Elevation.





Did #12, 13 in HW 2.4.