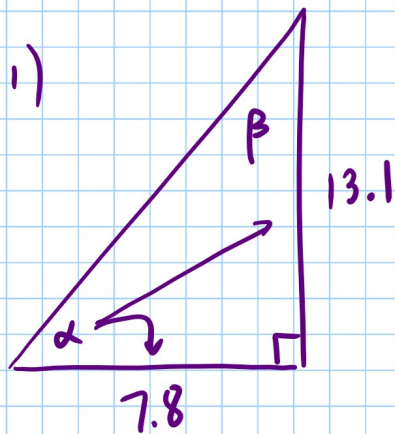


## WARMUP

Calculate  $\alpha$  and  $\beta$  in each.

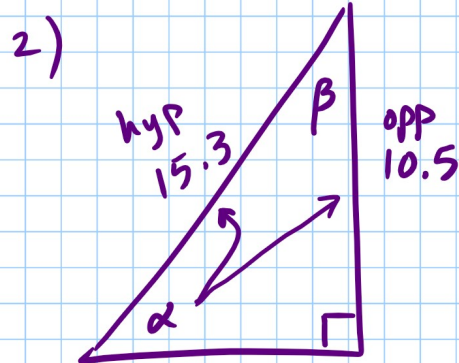


$$\tan \alpha = \frac{13.1}{7.8}$$

$$\alpha = \tan^{-1}\left(\frac{13.1}{7.8}\right)$$

$$\tan^{-1}(13.1/7.8) = 59.2^\circ$$

$$\beta = 180 - 90 - 59.2 = 30.8^\circ$$



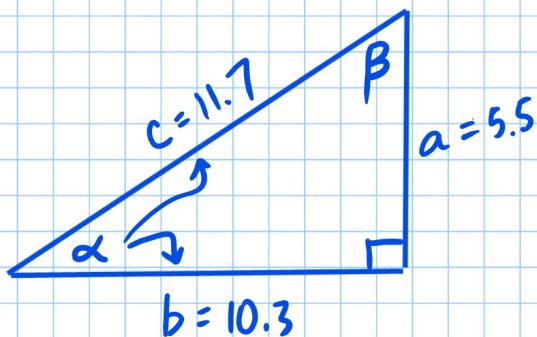
$$\sin \alpha = \frac{10.5}{15.3}$$

$$\alpha = \sin^{-1}(10.5/15.3) = 43.3^\circ$$

$$\beta = 180 - 90 - 43.3^\circ = 46.7^\circ$$

## Section 7.1 Continued

Solve the triangle with  $b=10.3$  and  $c=11.7$



$$a = \frac{5.5}{11.7}$$

$$\alpha = \frac{28.3^\circ}{11.7}$$

$$\beta = \frac{61.7^\circ}{11.7}$$

$$a^2 + 10.3^2 = 11.7^2$$

$$a^2 + 106.09 = 136.89$$

$$a^2 = 30.8$$

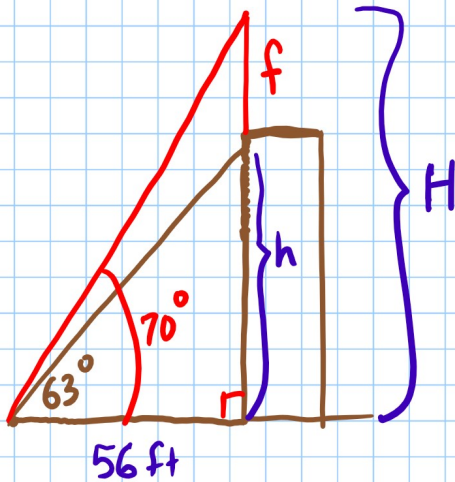
$$a = 5.5$$

$$\cos \alpha = \frac{10.3}{11.7}$$

$$\alpha = \cos^{-1}(10.3/11.7) = 28.3^\circ$$

$$\beta = 90 - 28.3 = 61.7^\circ$$

ex: Find the height of a flagpole on top of a building if an observer 56 feet from the building measures the angle of elevation to the top of the building as  $63^\circ$  and to the top of the flagpole as  $70^\circ$ .



$$\tan 70^\circ = \frac{H}{56}$$

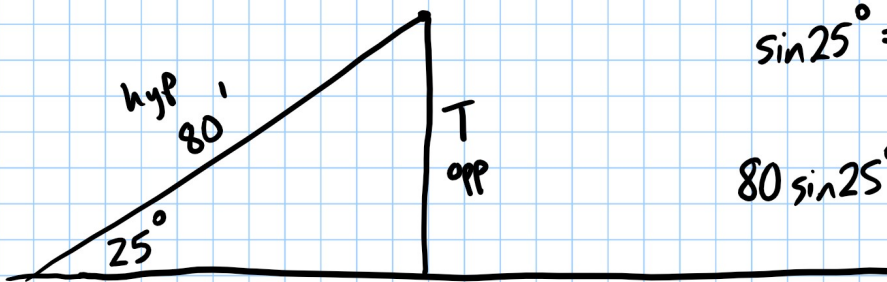
$$H = 56 \tan 70^\circ = 153.9'$$

$$\tan 63^\circ = \frac{h}{56}$$

$$h = 56 \tan 63^\circ = 109.9'$$

$$\text{flagpole} = 153.9 - 109.9 = 44.0'$$

ex: A guy wire 80 feet long is attached to the top of a radio transmission tower, making an angle of  $25^\circ$  with the ground. How tall is the tower.



$$\sin 25^\circ = \frac{T}{80}$$

$$80 \sin 25^\circ = T$$

$$T = 33.8 \text{ ft}$$

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56)

