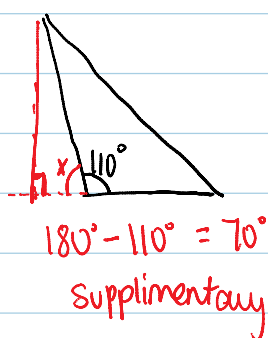


## 4.1 Exploring the Primary Trigonometric Ratios of Obtuse Angles

Oblique triangle: a triangle that does not contain a  $90^\circ$  angle

There are relationships between the value of primary trig. ratios for an acute angle and the value of the same trig. ratio for the supplement of the acute  $\angle$



For any angle  $\theta$

$$\begin{aligned} \sin \theta &= \sin(180^\circ - \theta) \\ \cos \theta &= -\cos(180^\circ - \theta) \\ \tan \theta &= -\tan(180^\circ - \theta) \end{aligned}$$

Ex.#1 Which of the following equations are valid? (equal)

(a.)  $\sin 25^\circ = \sin 65^\circ$   
 $0.422 = 0.906$   
 X NOT VALID

(b.)  $\cos 70^\circ = -\cos 110^\circ$   
 $0.34 = +0.34$   
 ✓ VALID

Ex.#2 Predict another angle that will have an = or opposite trig. ratio

(a.)  $\sin 15^\circ = ?$   
 $= 0.25 = \sin(180^\circ - \theta)$   
 $\checkmark = \sin(180^\circ - 15^\circ)$   
 $= \sin 165^\circ$   
 $= 0.25 \checkmark$

(b.)  $\tan 35^\circ = ?$   
 $0.7 = -\tan(180^\circ - \theta)$   
 $\checkmark = -\tan(180^\circ - 35^\circ)$   
 $= -\tan(145^\circ)$   
 $= 0.7$   
 $\checkmark$

Ex. #3 Determine 2 angles between  $0^\circ - 180^\circ$  that have each sine ratio.

(a) 0.64

$$\sin^{-1}(0.64) = 39.79 \approx 40^\circ$$

$$\begin{aligned} \boxed{\sin 40^\circ} &= \sin(180^\circ - \theta) \\ &= \sin(180^\circ - 40) \\ &= \boxed{\sin(140^\circ)} \end{aligned}$$

(b)  $\frac{8}{23} = 0.35$

$$\sin^{-1}(0.35) = 20^\circ$$

$$\begin{aligned} \boxed{\sin 20^\circ} &= \sin(180^\circ - \theta) \\ &= \sin(180^\circ - 20) \\ &= \boxed{\sin(160^\circ)} \end{aligned}$$

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