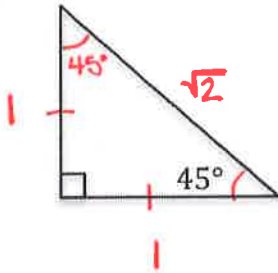


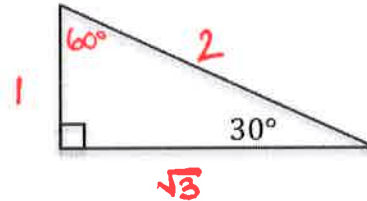
**Objective:** To evaluate trigonometric functions for any real angle with and without a calculator.

**Warm Up:** Find the missing side measures for the following special right triangles.

a.)



b.)

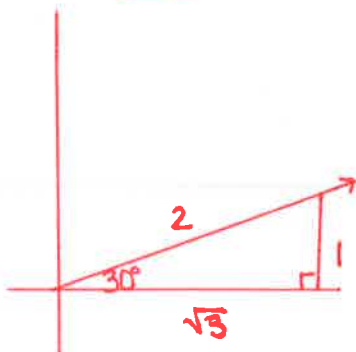


**Steps to Evaluating Trig Functions:**

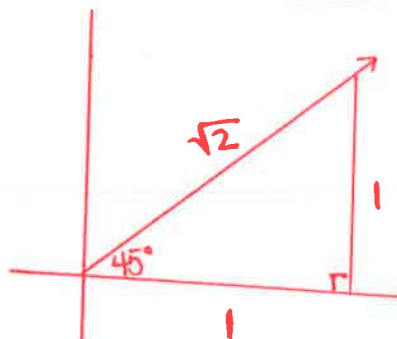
1. Find the coterminal angle (if necessary).
2. Determine the quadrant the terminal side is in
3. Find the reference angle
4. Fill in corresponding side lengths from special right triangles
5. Take a ratio of the specified sides for the trig function

**Examples:** Using reference triangles, evaluate the following.

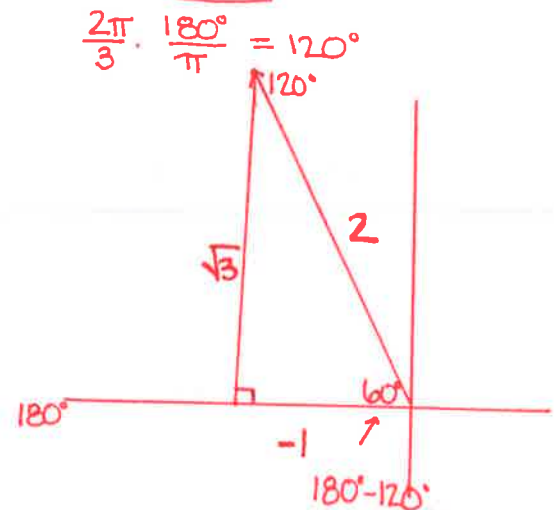
A.)  $\sin 30^\circ = \boxed{\frac{1}{2}}$



B.)  $\cos 45^\circ = \frac{1 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \boxed{\frac{\sqrt{2}}{2}}$



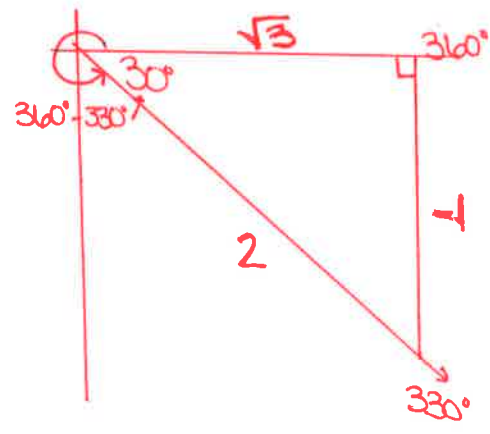
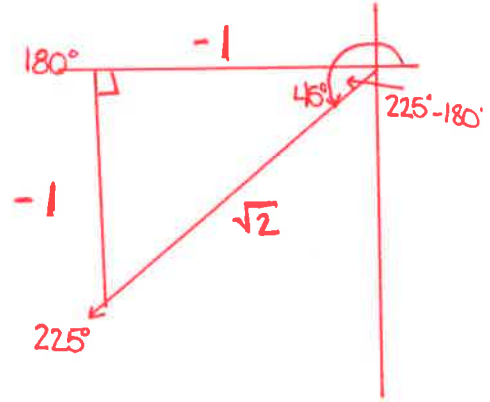
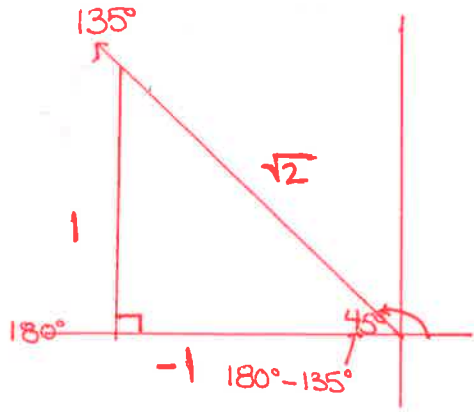
C.)  $\cos \frac{2\pi}{3} = \boxed{-\frac{1}{2}}$



E.)  $\tan 135^\circ = \frac{1}{-1} = \boxed{-1}$

F.)  $\sin 225^\circ = \frac{-1 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \boxed{\frac{-\sqrt{2}}{2}}$

H.)  $\tan \frac{11\pi}{6} = \frac{-1 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \boxed{\frac{-\sqrt{3}}{3}}$   
 $\frac{11\pi}{6} \cdot \frac{180^\circ}{\pi} = 330^\circ$

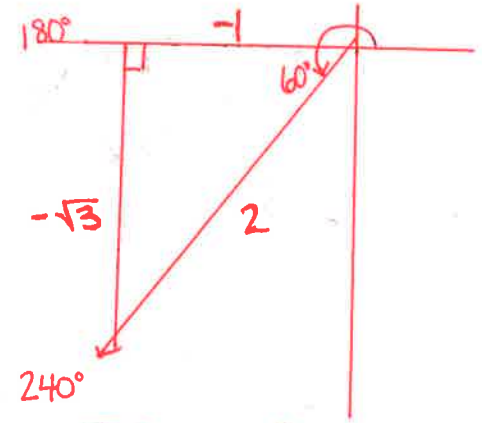
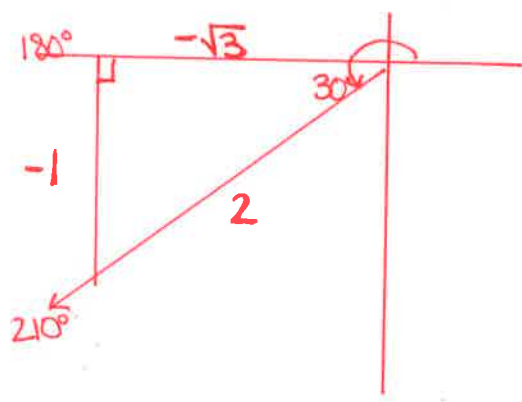
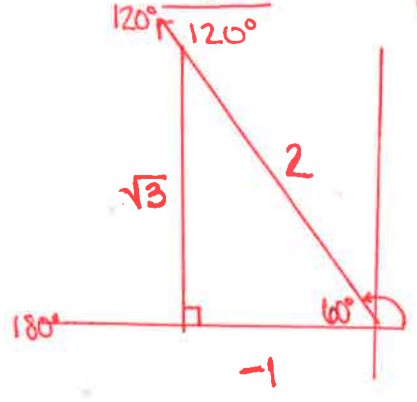


**Practice:** Using reference triangles, evaluate the following without using a calculator.

A.)  $\tan(-240^\circ) = \frac{\sqrt{3}}{-1} = \boxed{-\sqrt{3}}$

B.)  $\cos 210^\circ = \boxed{\frac{-\sqrt{3}}{2}}$

C.)  $\sin 240^\circ = \boxed{\frac{-\sqrt{3}}{2}}$



reciprocal of cosine  
 D.)  $\sec 135^\circ = \frac{\sqrt{2}}{-1} = \boxed{-\sqrt{2}}$

E.)  $\cos(-150^\circ) = \frac{-\sqrt{3}}{2}$

reciprocal of tangent  
 F.)  $\cot\left(\frac{-8\pi}{3}\right) = \frac{-1 \cdot \sqrt{3}}{-\sqrt{3} \cdot \sqrt{3}} = \boxed{\frac{\sqrt{3}}{3}}$

