Preliminaries and Objectives

Preliminaries:
- Values of sin and cos for special angles between 0° and 360° (between 0 and 2π radians).

Objectives:
- Find values for sin and cos for angles larger than 360° (larger than 2π).
- Find values for sin and cos for negative angles.

Sine and Cosine Values Repeat every 360°

\[ \sin 390° = \sin(360° + 30°) = \sin 30° = \frac{1}{2} \]

Solving Process for \( \theta > 360° \)

From the original angle, repeatedly subtract 360° until arriving at an angle between 0° and 360°.

Example 1: \( \sin 390° = \sin(390° - 360°) = \sin 30° = \frac{1}{2} \)

Example 2:
\[ \cos 1230° = \cos(1230° - 360°) = \cos 870° = \cos(870° - 360°) = \cos 510° = \cos(510° - 360°) = \cos 150° = \frac{-\sqrt{3}}{2} \]

Symmetries of the Unit Circle

\[ \sin(-\theta) = -\sin(\theta) \quad \text{TRUE} \]
\[ \cos(-\theta) = \cos(\theta) \quad \text{FALSE} \]

\[ \sin\left(-\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2} \]
\[ \cos\left(-\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} \]
Examples

Find \( \cos \left( -\frac{19\pi}{6} \right) = \cos \left( -\frac{7\pi}{6} \right) \cos \left( \frac{5\pi}{6} \right) = \frac{-\sqrt{3}}{2} \)

Find \( \sin \left( -\frac{22\pi}{3} \right) = \sin \left( \frac{2\pi}{3} \right) = \frac{\sqrt{3}}{2} \)

Recap

- To find \( \sin \) and \( \cos \) values of angles greater than 360° (2\( \pi \)), subtract full circles to reach an angle on the unit circle.

- To find \( \sin \) and \( \cos \) values of negative angles, add full circles to reach an angle on the unit circle.