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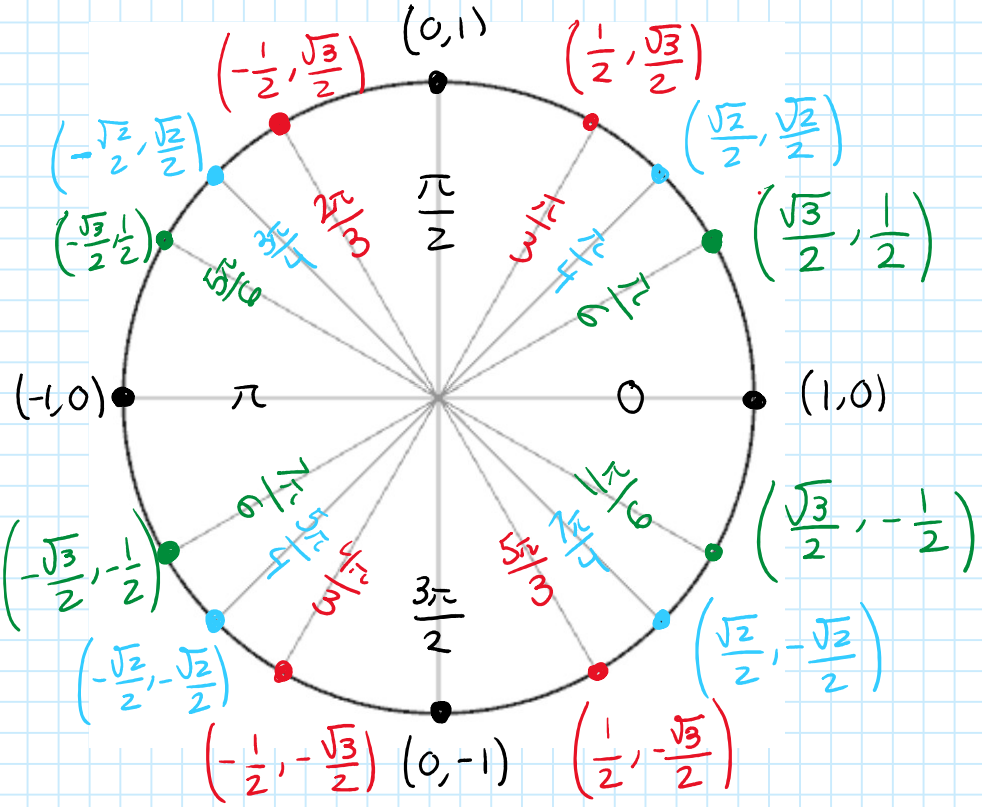

Find terminal point for $\frac{29\pi}{6}$

Idea $\frac{29\pi}{6}$ is NOT on unit circle so we have to find an angle on unit circle coterminal to $\frac{29\pi}{6}$

Note: $\frac{29\pi}{6} = \underbrace{4\pi}_{\text{go around twice}} + \frac{5\pi}{6} \Rightarrow$ coterminal to $\frac{5\pi}{6}$

so $29\pi/6$ has terminal point $\left(-\frac{\sqrt{3}}{2},\frac{1}{2}\right)$

Your turn: find terminal point for

(a) $\frac{13\pi}{4} = 2\pi + \frac{5\pi}{4}$ $\left(-\frac{\sqrt{2}}{2},\frac{\sqrt{2}}{2}\right)$

(b) $\frac{41\pi}{6} = 6\pi + \frac{5\pi}{6}$ $\left(-\frac{\sqrt{3}}{2},\frac{1}{2}\right)$

(c) $-\frac{41\pi}{6} = -10\pi - \frac{\pi}{4}$ $\left(\frac{\sqrt{2}}{2},-\frac{\sqrt{2}}{2}\right)$

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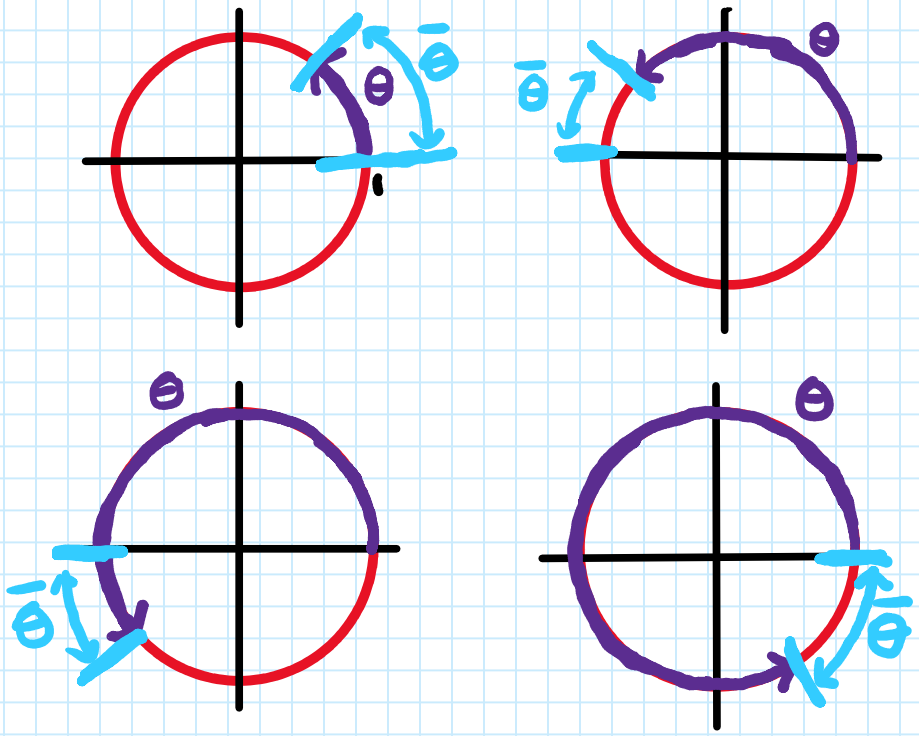
The reference angle $\bar{\theta}$ of θ is the shortest distance along the unit circle between terminal point of θ & x-axis



Typically, we find reference angles by

1. Fully reducing fraction
2. Replacing numerator with π
3. Getting rid of negative

(DOES NOT WORK IF θ DOES NOT CONTAIN "π")

Examples

(a) $\theta = \frac{5\pi}{6}$ $\quad \bar{\theta} = \frac{\pi}{6}$

(b) $\theta = \frac{7\pi}{4}$ $\quad \bar{\theta} = \frac{\pi}{4}$

(c) $\theta = \frac{-2\pi}{3}$ $\quad \bar{\theta} = \frac{\pi}{3}$

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Using reference angles to find terminal points

① Find $\bar{\theta}$

② Find terminal point of $\bar{\theta}$

③ Find terminal point of θ by adjusting signs of ② using quadrants

Examples

(a) $\theta = \frac{5\pi}{6}$

① $\bar{\theta} = \pi/6$

② $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

③ T.P. of θ is in quadrant II

$$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$

(b) $\theta = \frac{7\pi}{4}$

① $\bar{\theta} = \frac{\pi}{4}$

② $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

③ T.P. of θ in quad. IV

$$\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$$

(c) $\theta = -\frac{7\pi}{6}$

① $\bar{\theta} = \frac{\pi}{6}$

② $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

③ T.P of θ in quad. II

$$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$