RAAs and Principal Angles.

Nov 25, 2020
period 4

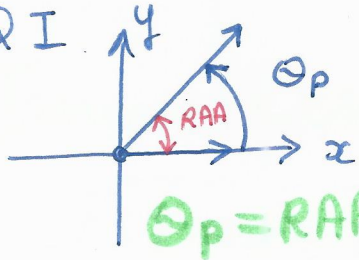
$0° < RAA < 90°$ (b/n the terminal arm and the x-axis)

$0° < \Theta_p < 360°$ (Θ_p is the principal angle)

↳ simplest positive representation for the actual angle.

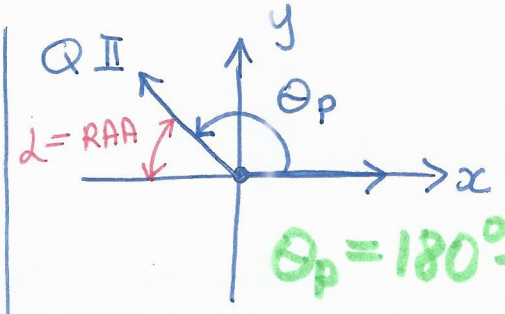
Give $RAA = \alpha$ (alpha), four principal angles can be generated.

QI



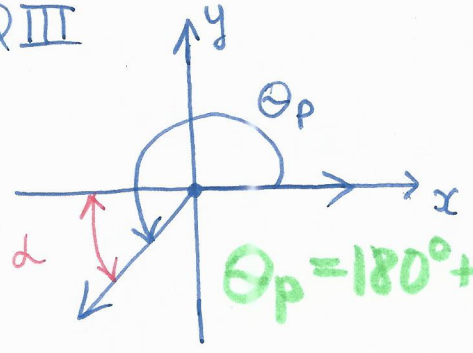
$\Theta_p = RAA = \alpha$

QII



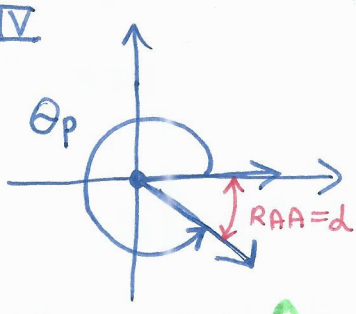
$\Theta_p = 180° - \alpha$

QIII



$\Theta_p = 180° + \alpha$

QIV



$\Theta_p = 360° - \alpha$

Conclusion: Knowing RAA, α, and the quadrant we can find the Θ_p

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Example: Let $RAA = 30°$, find the four possible principal angles (that share that RAA)

Θ_p: $30°, 150°, 210°, 330°$

$\sin 30° = \frac{1}{2}$; $\sin 150° = \frac{1}{2}$; $\sin 210° = -\frac{1}{2}$; $\sin 330° = -\frac{1}{2}$

$\cos 30° = \frac{\sqrt{3}}{2}$; $\cos 150° = -\frac{\sqrt{3}}{2}$; $\cos 210° = -\frac{\sqrt{3}}{2}$, $\cos 330° = \frac{\sqrt{3}}{2}$

$\tan 30° = \frac{\sqrt{3}}{3}$; $\tan 150° = -\frac{\sqrt{3}}{3}$; $\tan 210° = \frac{\sqrt{3}}{3}$; $\tan 330° = -\frac{\sqrt{3}}{3}$

$|\sin 30°| = |\sin 150°| = |\sin 210°| = |\sin 330°| = \frac{1}{2}$

The absolute values of trig. ratios for principal angles sharing the same RAA are the same.

The only difference is the sign: ±!