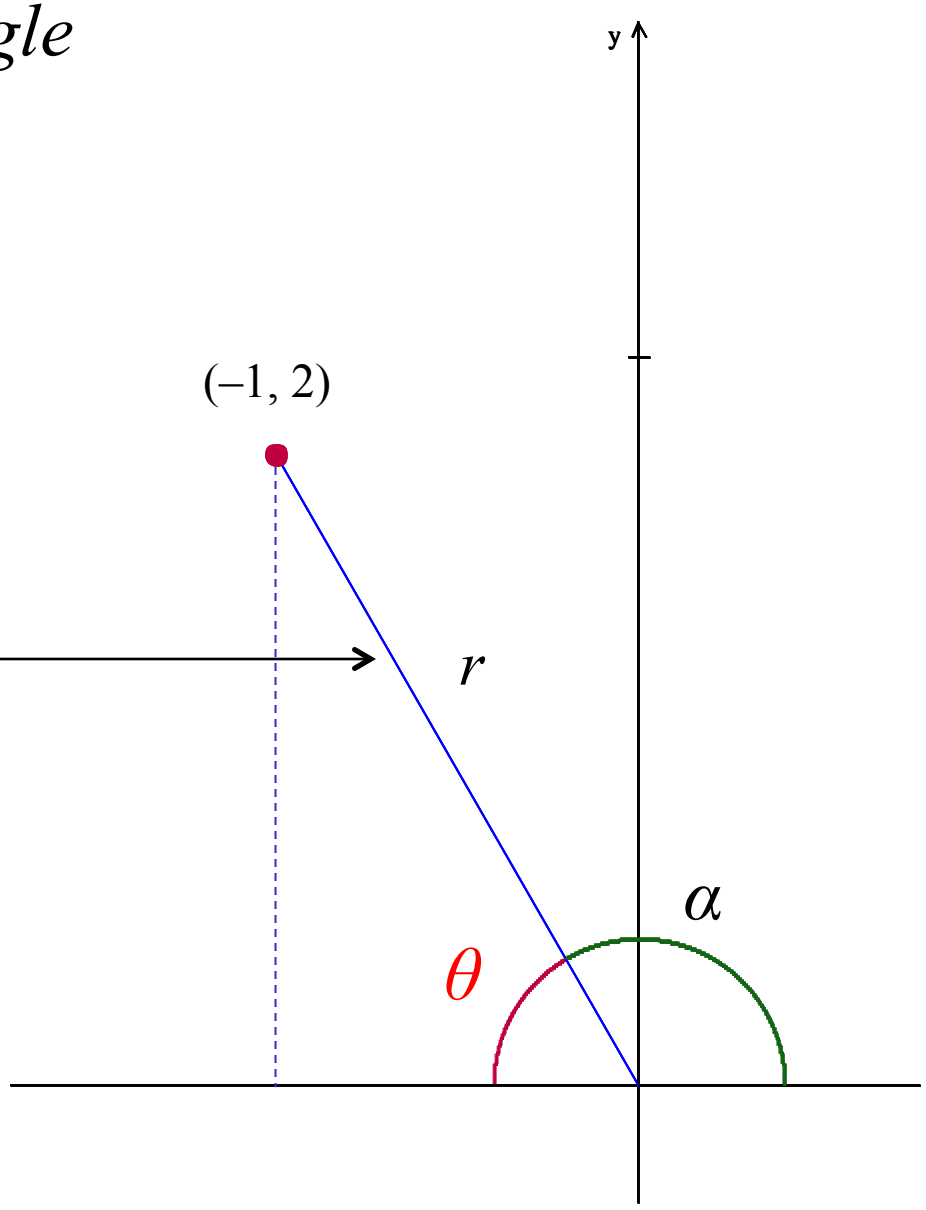
Reference Angles

Yes, they are *this* important

θ is called the *reference angle*

reference angle

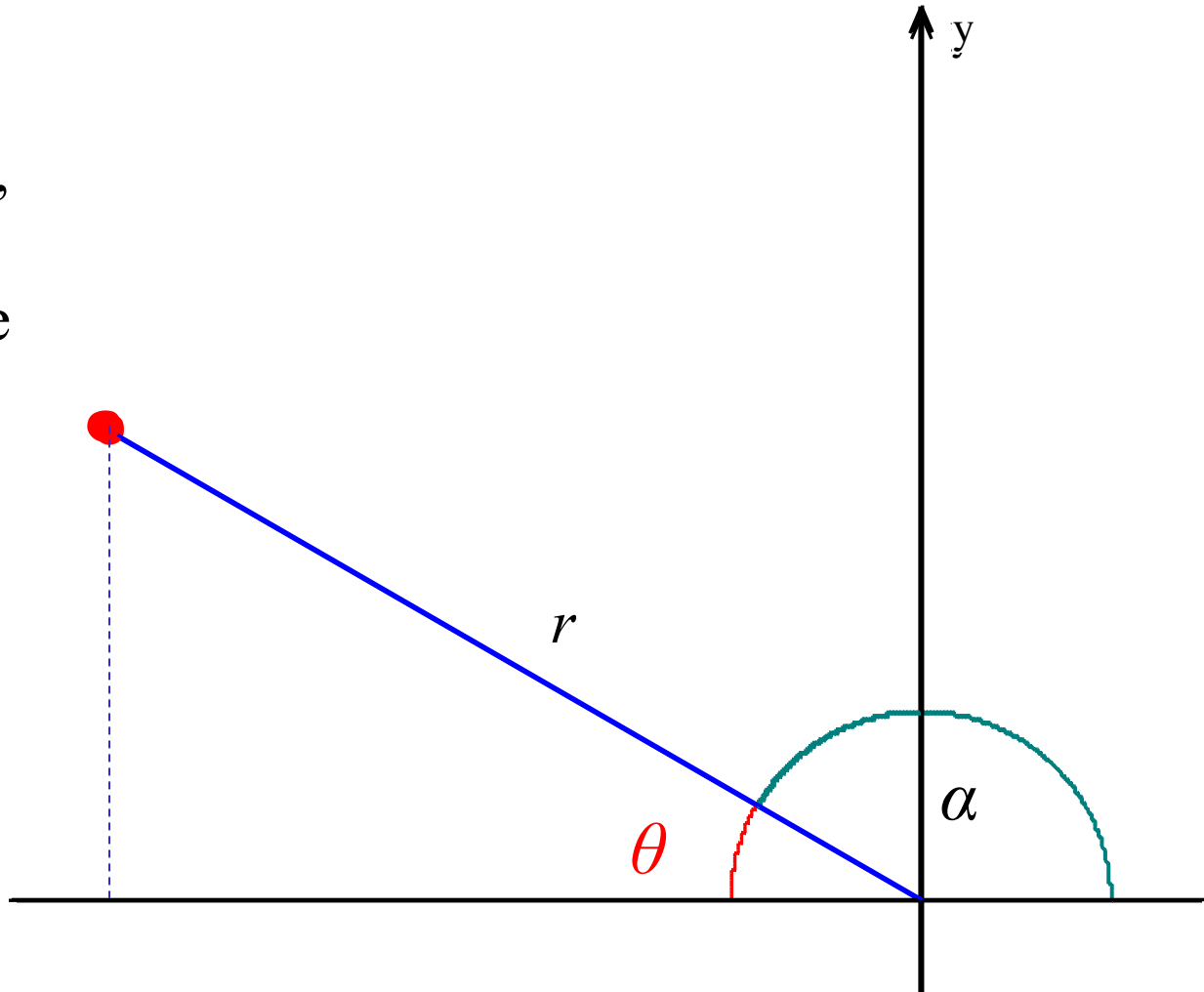
The acute angle made between the terminal side (r) and the x-axis



θ is called the *reference angle*

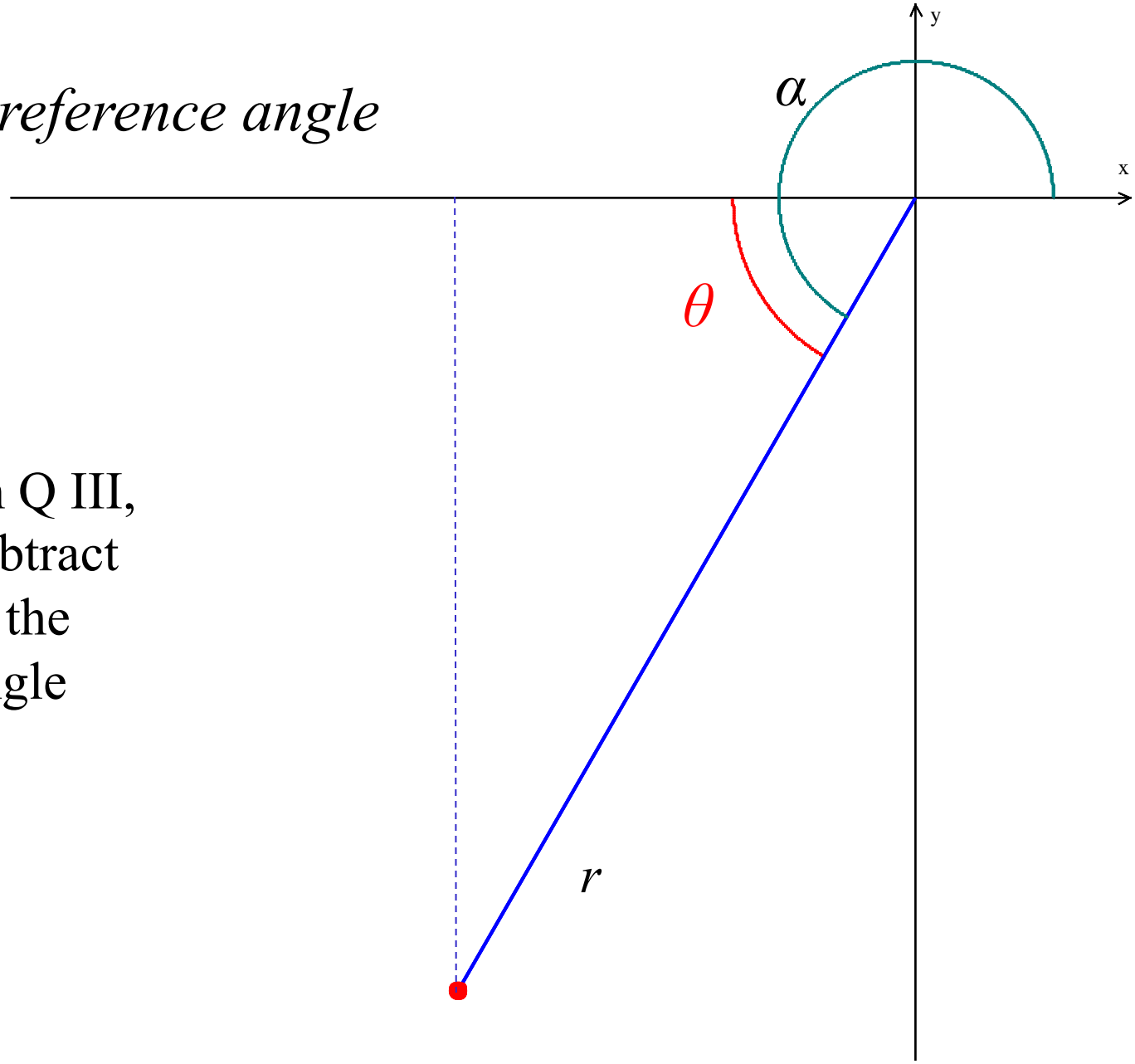
Be careful when calculating this.

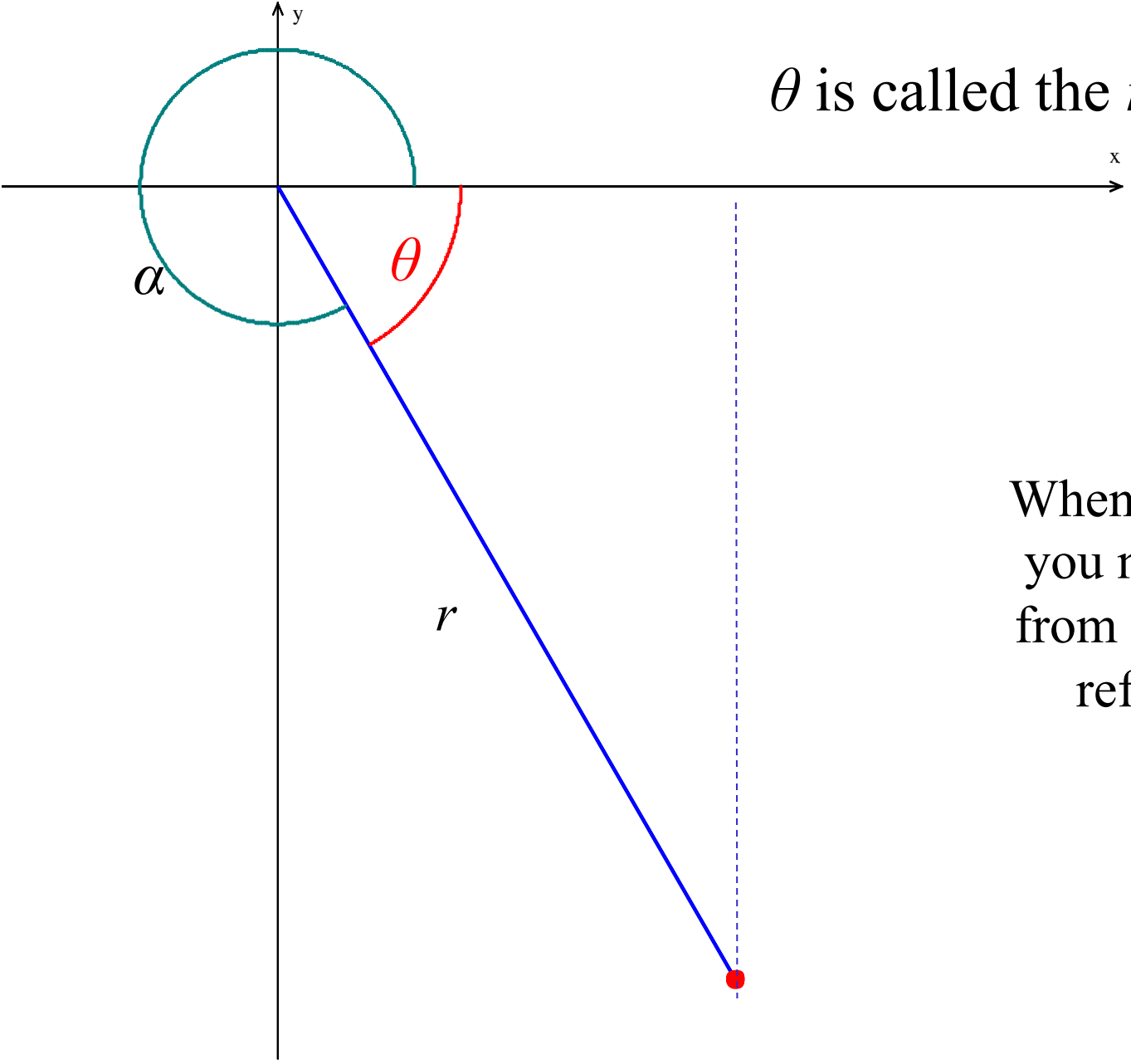
When you're in Q II, you need to subtract <u>from</u> 180° to find the reference angle



θ is called the *reference angle*

When you're in Q III, you need to subtract 180° to find the reference angle





θ is called the *reference angle*

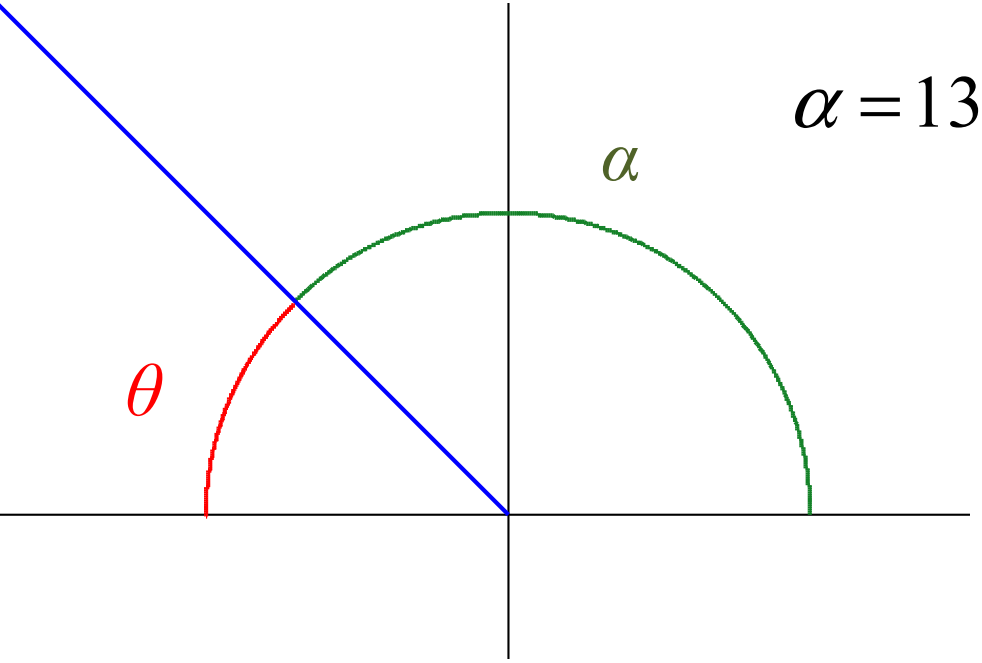
When you're in Q IV, you need to subtract from 360° to find the reference angle

$\cos\alpha = -\frac{\sqrt{2}}{2}$ $\quad 0 < \alpha < 360°$

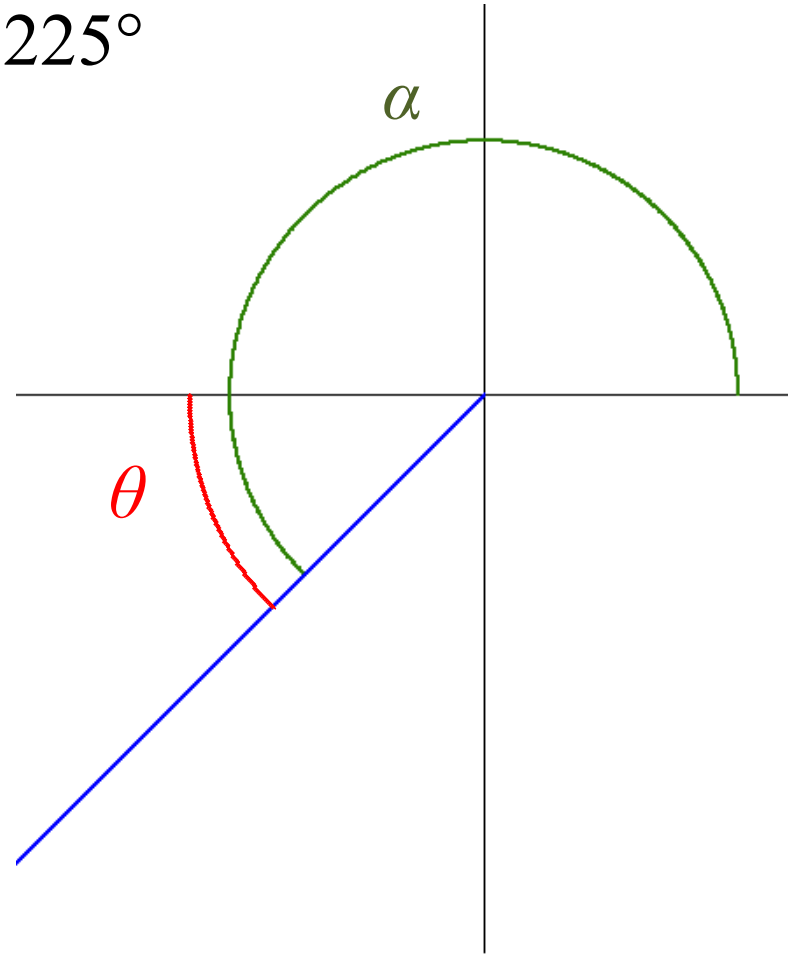
Since the cosine is negative, α will be in QII and III

Find the values of α

Remember that in QI $\cos 45° = \frac{\sqrt{2}}{2}$



$\alpha = 135°, 225°$



This is where we can use the *reference angle*

$\theta = 45°$

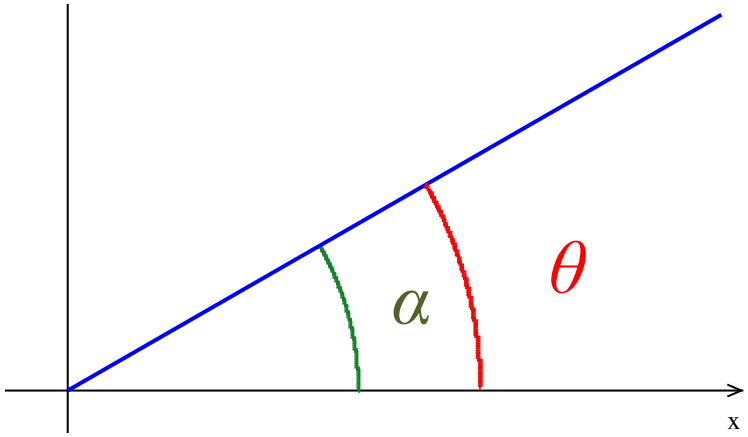
$$\tan\alpha = \frac{1}{\sqrt{3}}$$

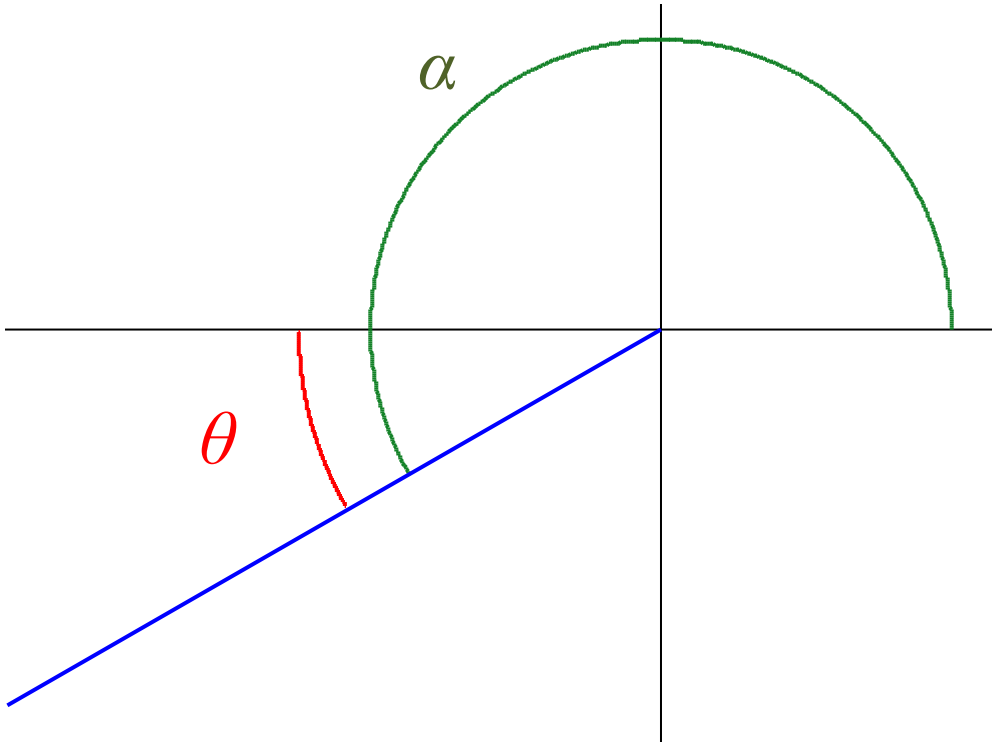
Since tan is positive, α will be in Quadrants

I and III

Find all possible values of α

Remember that in QI $\tan 30° = \frac{1}{\sqrt{3}}$





The *reference angle* here is

$\theta = 30°$

So our solutions are $\alpha = 30° \pm 360n$ and $\alpha = 210° \pm 360n$

$$\tan\alpha = \frac{1}{\sqrt{3}}$$

Find all possible values of α

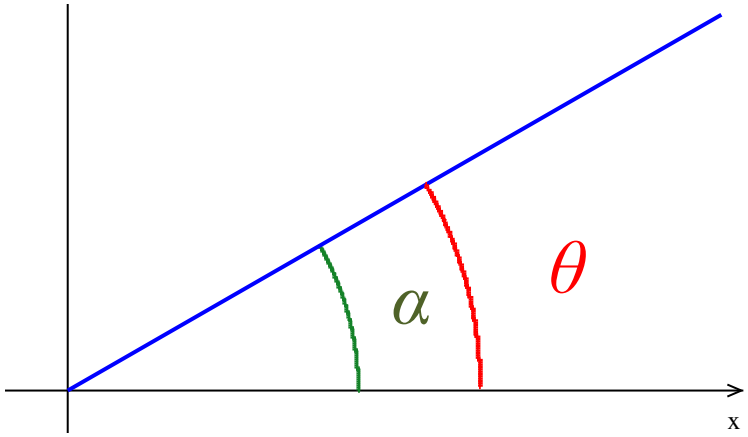
$$\alpha = 30° \pm 360n$$

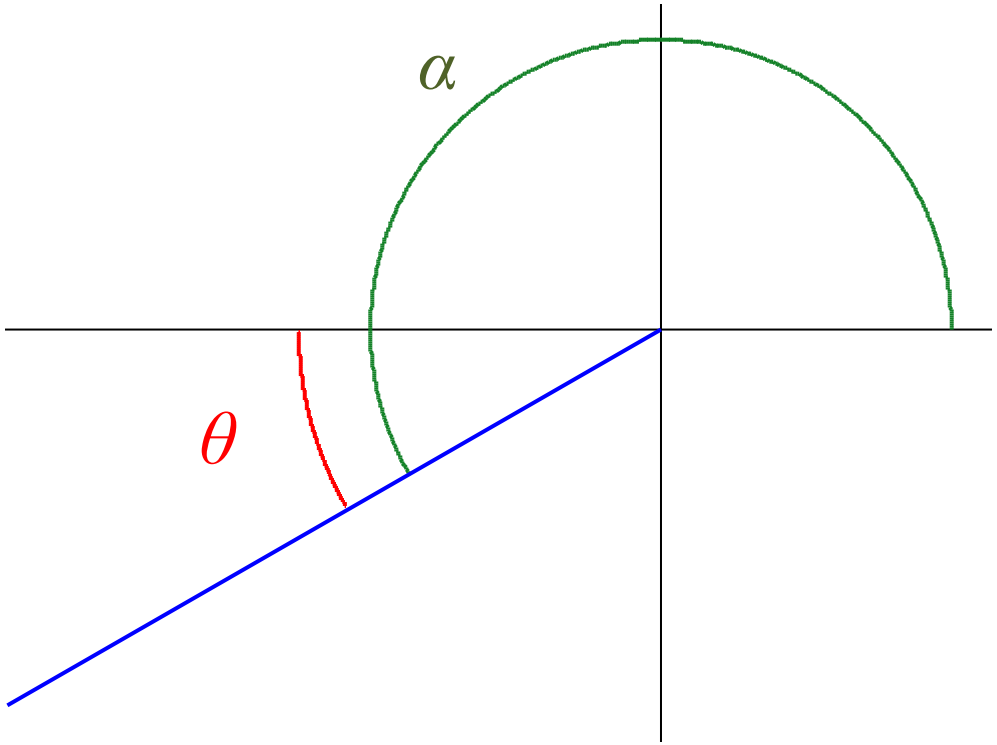
and

$$\alpha = 210° \pm 360n$$

But what are these?

They account for all the angles coterminal to 30° and 210°





Can we write these as one equation?

$$\alpha = 30° \pm 180n$$