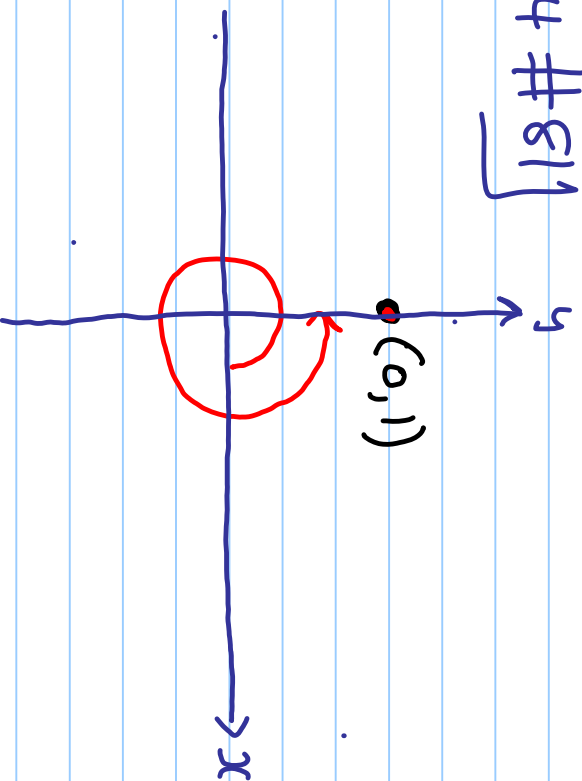


October 29, 2010

Note Title

10/29/2010

§6.4 #81



$$\theta = 45^\circ$$

Coterminal angle

$$\sin(45^\circ) = \frac{1}{\sqrt{2}}$$

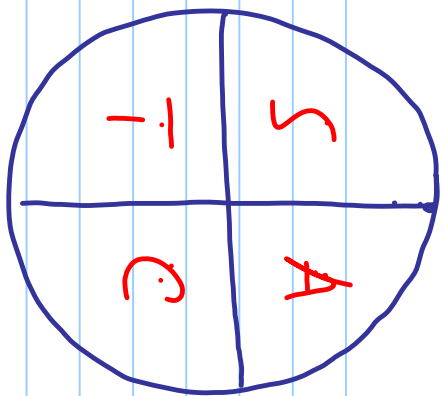
$$\cos(45^\circ) = \frac{1}{\sqrt{2}}$$

$$\tan(45^\circ) = \frac{y}{x} = \frac{1}{1} = 1 \text{ undefined}$$

$$\sec \theta = \frac{1}{\cos \theta} = \frac{1}{\frac{1}{\sqrt{2}}} = \sqrt{2}$$

$$r = \sqrt{x^2 + y^2} = 1$$

$$\cot(45^\circ) = \frac{x}{y} = \frac{1}{1} = 1$$



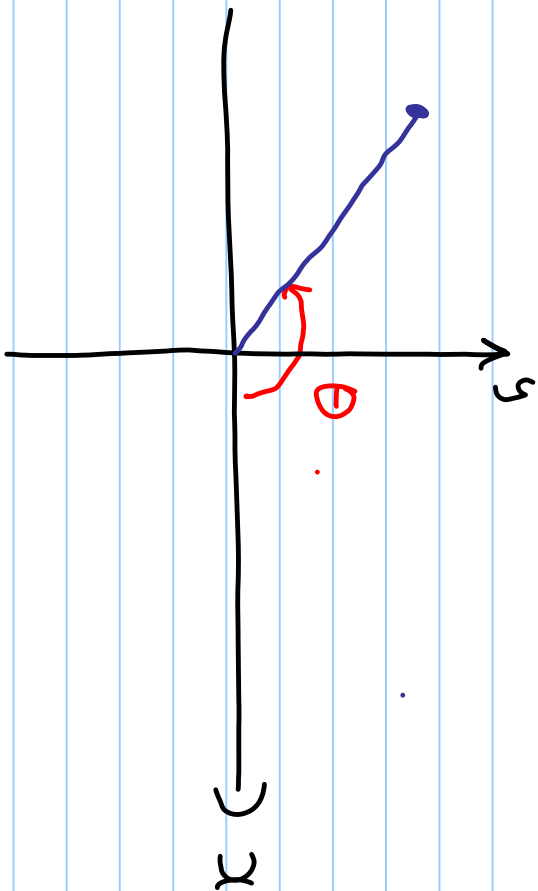
$$\tan \theta = \frac{y}{x} = -\frac{1}{2}$$

In quadrant II

- y is positive
- x is negative

$\tan \theta = -\frac{1}{2}$   
Terminal side is Q II

Find  $\cos \theta$ .



$$\text{So } \tan \theta = \frac{y}{x} = \frac{1}{-2} \quad \therefore \begin{matrix} y = 1 \\ x = -2 \end{matrix}$$

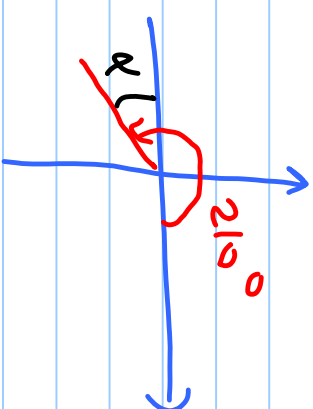
$$\begin{aligned} \cos \theta &= \frac{x}{r} & r &= \sqrt{x^2 + y^2} \\ & & &= \sqrt{(-2)^2 + 1^2} \\ & & &= \sqrt{5} \\ & & &= \frac{-2}{\sqrt{5}} \\ & & &= \frac{-2\sqrt{5}}{5} \end{aligned}$$

## Example

Find the reference angle for each given angle.

a)  $\theta = 210^\circ$

Reference angle  $\alpha = 210^\circ - 180^\circ = 30^\circ$

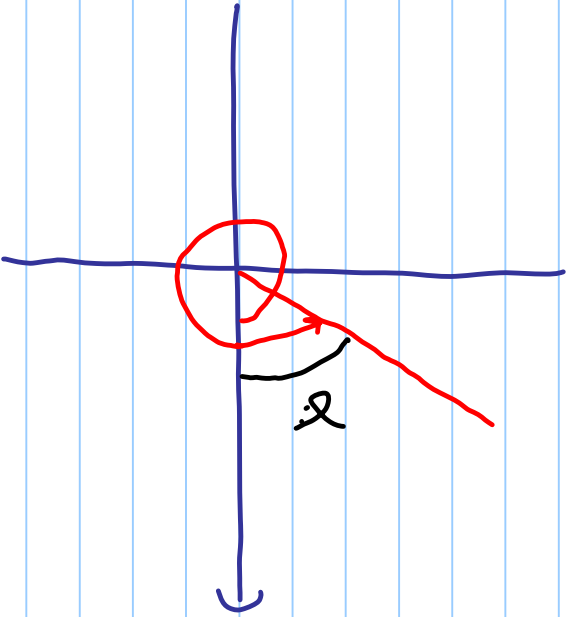


b)  $\theta = 135^\circ$

reference angle

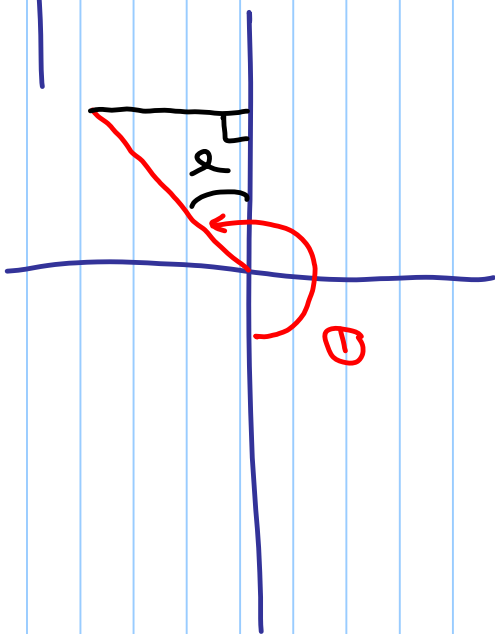
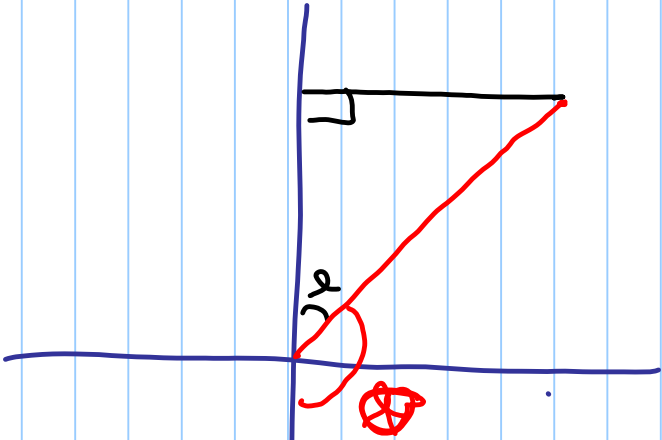
$$\alpha = 180^\circ - 135^\circ = 45^\circ$$

b)  $\theta = 422^\circ$



$$\alpha = 422^\circ - 360^\circ = 62^\circ$$

# Reverse right triangle



## Example

Find the exact value of

$$a) \cos 120^\circ$$

reference angle  $\alpha = 180^\circ - 120^\circ = 60^\circ$

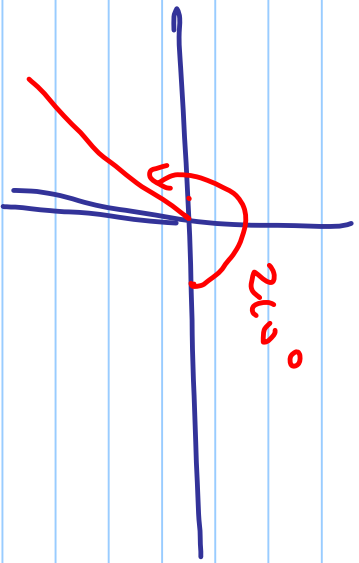
$$\cos \alpha = \cos 60^\circ = \frac{1}{2}$$

$120^\circ$  is in quadrant II and  $\cos \theta$  is negative in QII

$$\text{So } \cos 120^\circ = -\cos 60^\circ$$

$$\frac{S}{T} \mid \frac{A}{C}$$

b)  $\tan 210^\circ$  --- Quadrant III and tangent is positive



Reference angle  $\alpha = 210^\circ - 180^\circ$   
 $= 30^\circ$

$$\tan \alpha = \tan 30^\circ$$

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

$$\sin 30^\circ = \frac{1}{2}$$

$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

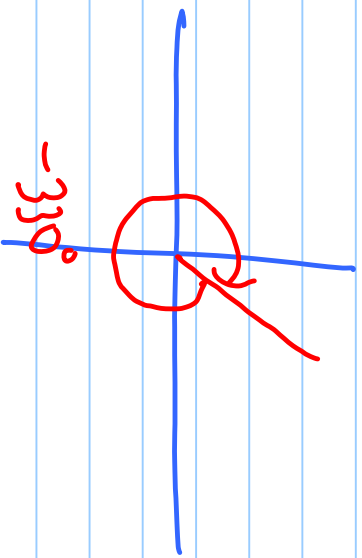
$$\text{So } \tan 210^\circ = \tan 30^\circ = \frac{\sqrt{3}}{3}$$



$$c) \sec(-330^\circ)$$

In Quadrant I

$\sec \theta = \frac{1}{\cos \theta}$  is positive in QI



Reference angle  $\alpha = -330^\circ + 360^\circ$

$$= 30^\circ$$

$$\sec 30^\circ = \frac{1}{\cos 30^\circ} = \frac{1}{\frac{\sqrt{3}}{2}} = \frac{2}{\sqrt{3}}$$

$$\therefore \sec(-330^\circ) = \sec 30^\circ = \frac{2\sqrt{3}}{3} = \frac{2\sqrt{3}}{3}$$

## Example

Find all possible values of  $\theta$ , where

$$0 < \theta \leq 360^\circ \text{ where}$$

$$\sin \theta = \frac{\sqrt{3}}{2}.$$

