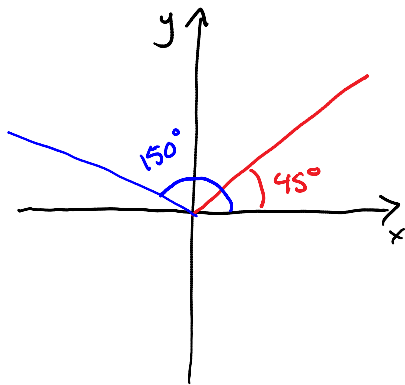


Section 6.3: Trig Functions of Any Angle

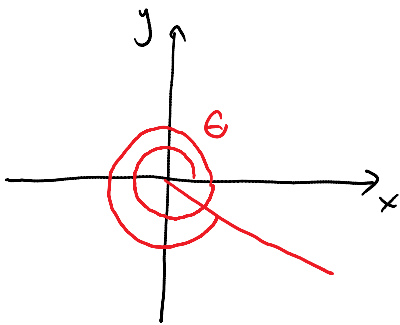
Monday, January 12, 2015
1:42 PM



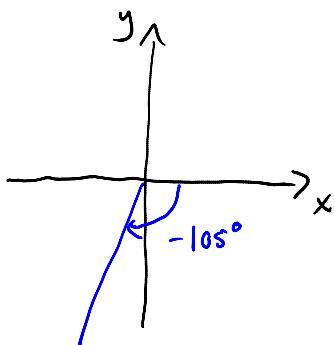
angle in standard position:

- has initial arm on the positive x-axis

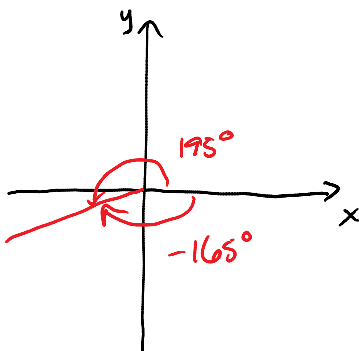
- rotate CCW (counterclockwise) to the terminal arm



$$\theta = 2 \cdot 360^\circ - 30^\circ = 690^\circ$$



negative angles rotate clockwise (CW)



195° and -165° are coterminal angles

and so is 555° and ...

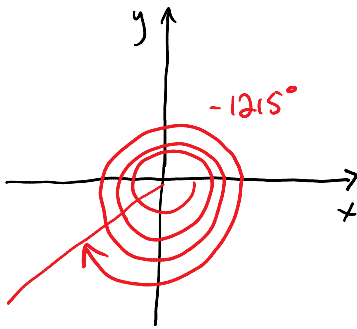
in fact, all angles θ where

$$\theta = 195^\circ + n \cdot 360^\circ$$

where n is an integer

are coterminal with 195°

full example: sketch -1215° in standard position and list one positive and one negative coterminal angle.



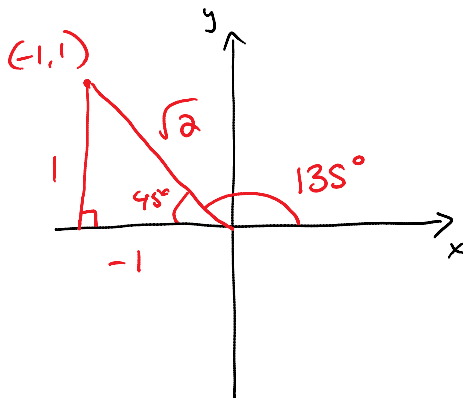
$$-1215^\circ = -1080^\circ + (-135^\circ)$$

(3 revs)

coterminal angles: -135°
 225°
(other answers possible)

why do we care?

example: write the values of the six trig functions of 135° .



- "drop a perpendicular" to the nearest x-axis to create a right triangle

- examine the sides and if they correspond to negative coordinates, label as negative

- hypotenuse is always +

$$\sin 135^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos 135^\circ = \frac{-1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$$

$$\tan 135^\circ = \frac{1}{-1} = -1$$

$$\csc 135^\circ = \sqrt{2}$$

$$\sec 135^\circ = -\sqrt{2}$$

$$\cot 135^\circ = -1$$

$$\tan 135^\circ = \frac{\sqrt{2}}{-1} = -\sqrt{2}$$

$$\cot 135^\circ = -1$$