Objective: Find reference angles.

Reference Angles

A reference angle is the acute angle formed by the terminal side of an angle and the x-axis.

It is used for describing triangles in the coordinate plane that have angles that are more than 90°

The reference angle is always positive.

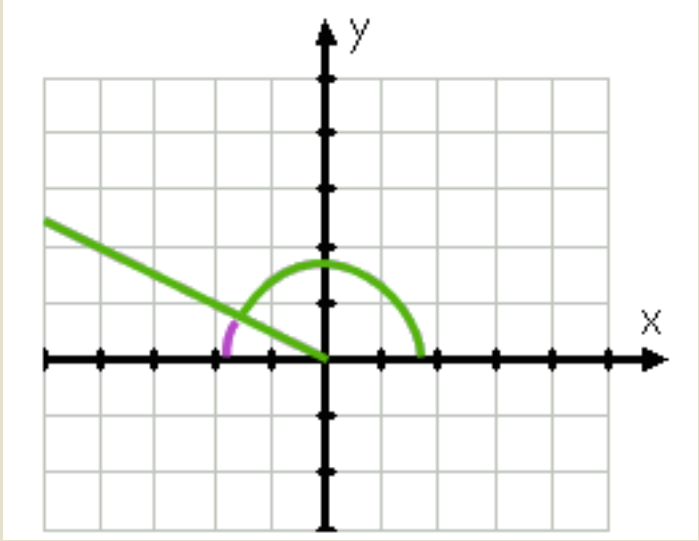
Objective: Find reference angles.

Finding Reference Angles

The green angle is 150˚. Since this angle is over 90˚ you must calculate the reference angle (shown in purple).

We know that full distance is 180˚ so the reference angle would be 180˚-150˚ = 30˚.

The process for finding the reference angle depends on which quadrant the angle lies.



Objective: Find reference angles.

Finding Reference Angles

The process for finding the reference angle depends on which quadrant in which the angle lies.

Quadrant	Reference angle for θ
1	Same as θ
2	180 - θ
3	θ - 180
4	360 - θ

Objective: Find reference angles.

Finding Reference Angles

If you are working with radians, use the same process but replace the 180˚ with π and the 360˚ with 2π.

Quadrant	Reference angle for θ
1	Same as θ
2	$\pi - \theta$
3	$\theta - \pi$
4	$2\pi - \theta$

Objective: Find reference angles.

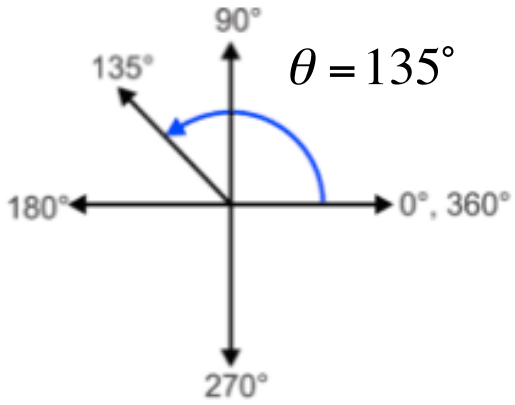
Finding Reference Angles

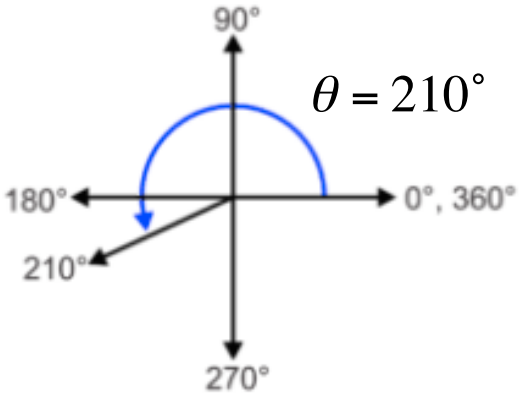
I would recommend you do not try to memorize the two tables on the previous slides. It would be better to think about the values each time in terms of the coordinate plane.

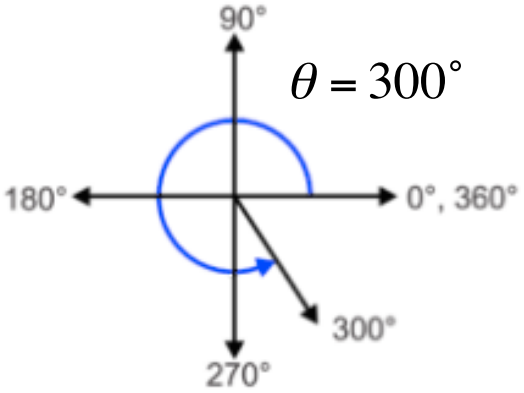
Objective: Find reference angles.

Find the reference angle for each given angle.

Examples:



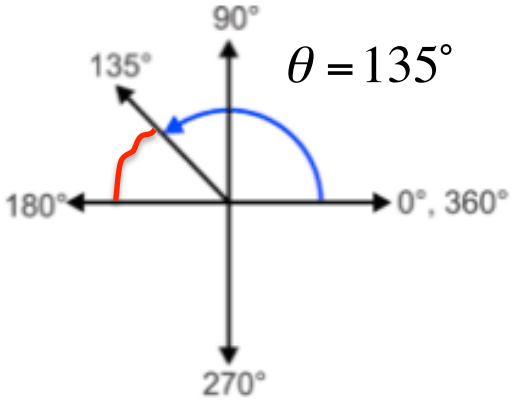




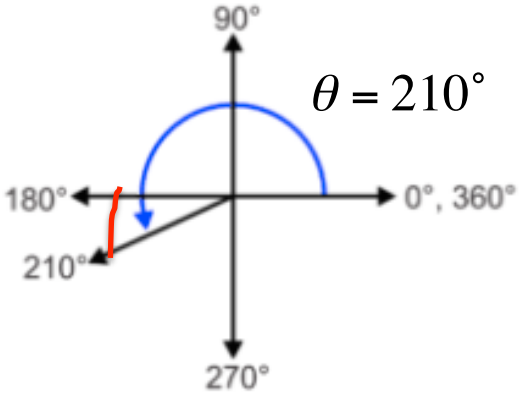
Objective: Find reference angles.

Find the reference angle for each given angle.
(reference angle θ'given in red)

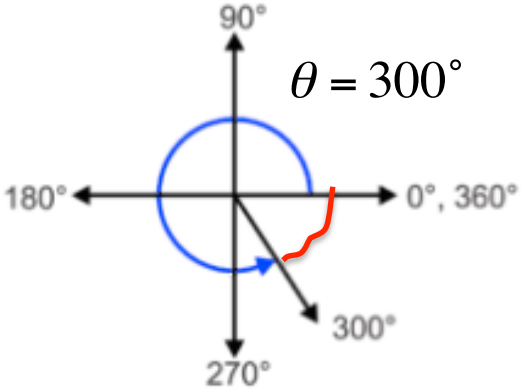
Examples:



$\theta' = 45^\circ$



$\theta' = 30^\circ$



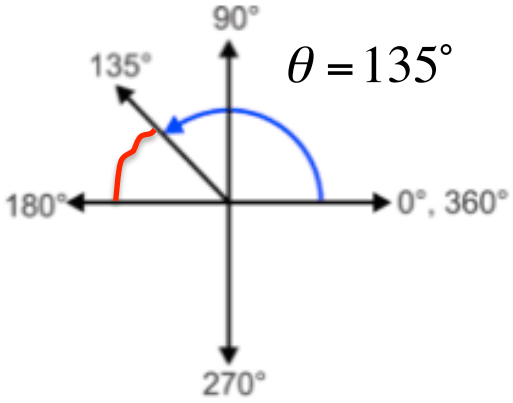
$\theta' = 60^\circ$

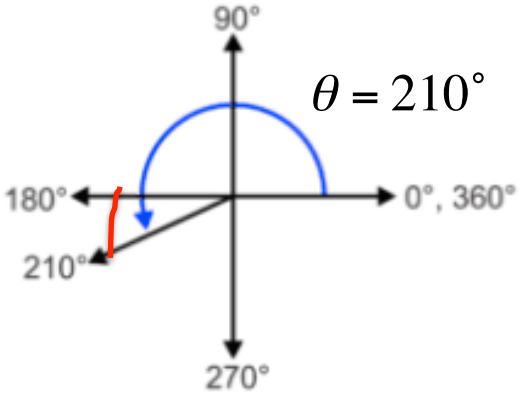
Work shown on next slide

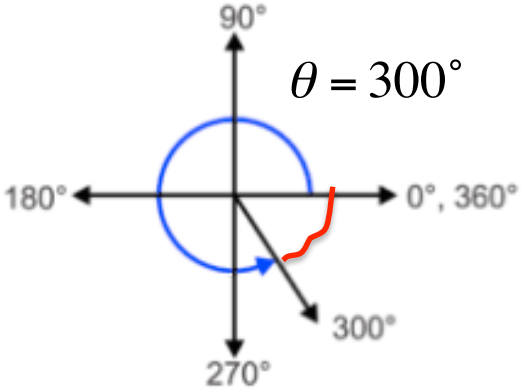
Objective: Find reference angles.

Find the reference angle for each given angle.
(reference angle θ' given in red)

Examples:







$\theta' = 180^\circ - 135^\circ$

$\theta' = 45^\circ$

$\theta' = 210^\circ - 180^\circ$

$\theta' = 30^\circ$

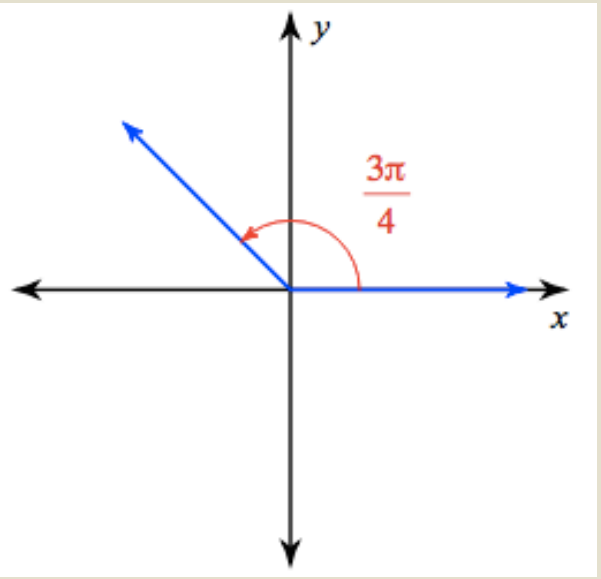
$\theta' = 360^\circ - 300^\circ$

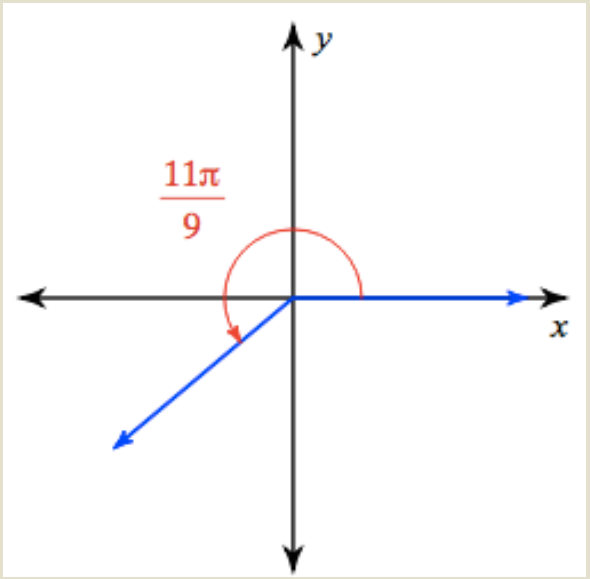
$\theta' = 60^\circ$

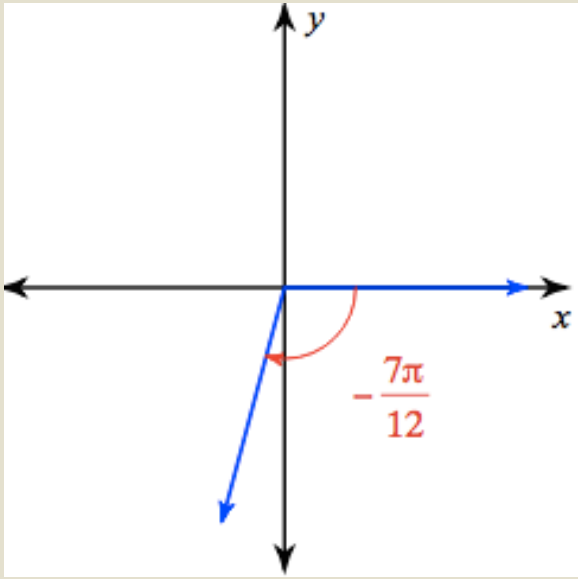
Objective: Find reference angles.

Find the reference angle for each given angle.

Examples:



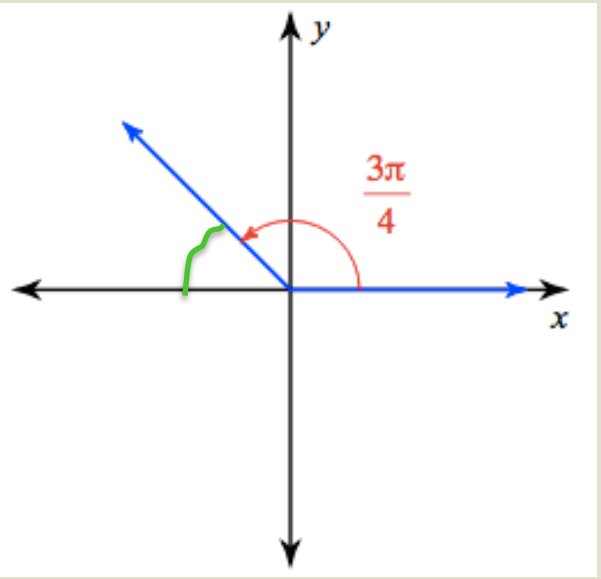


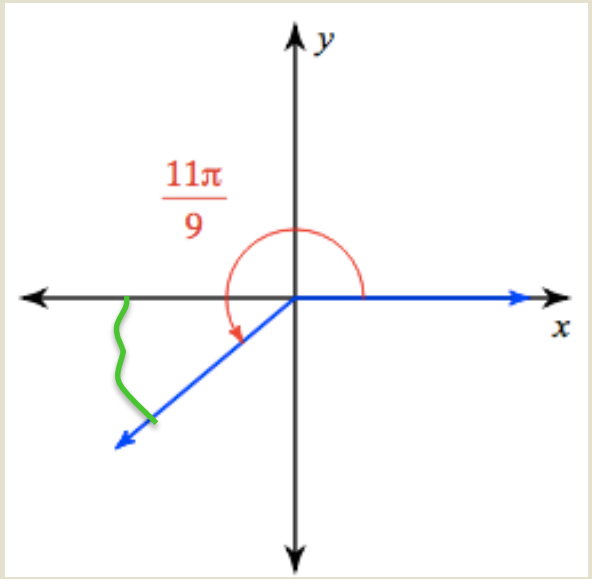


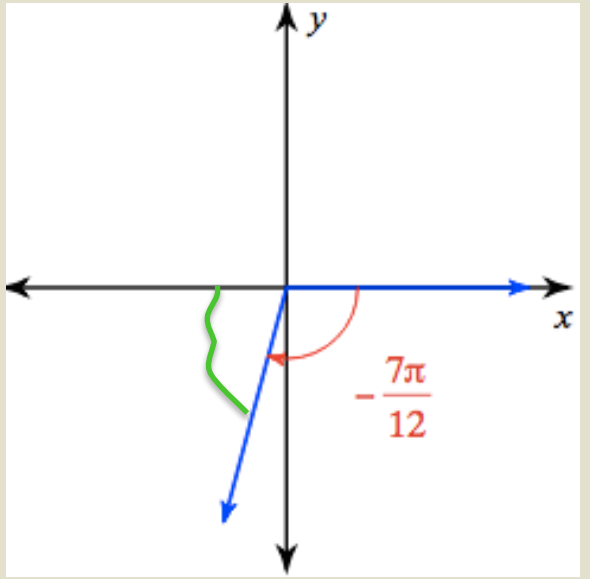
Objective: Find reference angles.

Find the reference angle for each given angle.
(reference angle θ' given in green)

Examples:







$\theta' = \frac{\pi}{4}$

$\theta' = \frac{2\pi}{9}$

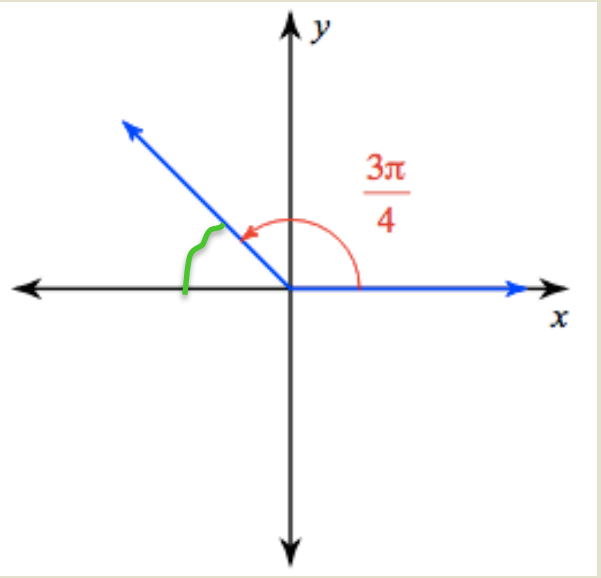
$\theta' = \frac{5\pi}{12}$

Work shown on next slide

Objective: Find reference angles.

Find the reference angle for each given angle.
(reference angle θ' given in green)

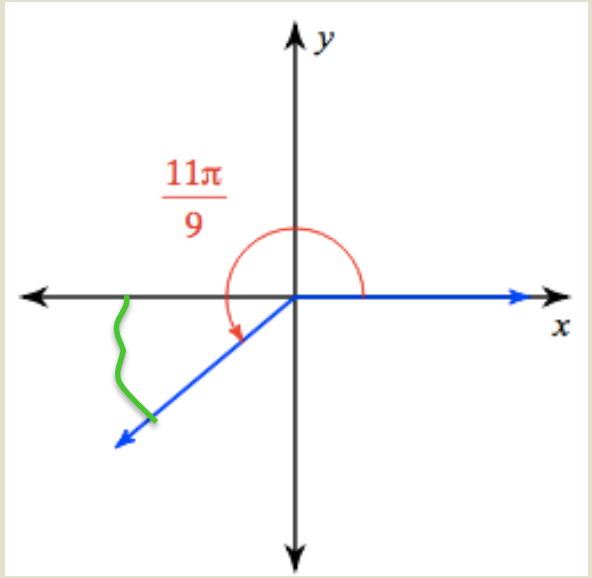
Examples:



$$\theta' = \pi - \frac{3\pi}{4}$$

$$\theta' = \frac{4\pi}{4} - \frac{3\pi}{4}$$

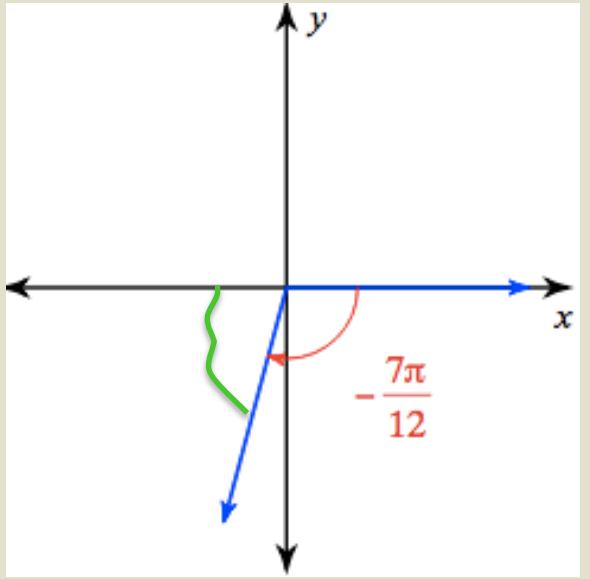
$$\theta' = \frac{\pi}{4}$$



$$\theta' = \frac{11\pi}{9} - \pi$$

$$\theta' = \frac{11\pi}{9} - \frac{9\pi}{9}$$

$$\theta' = \frac{2\pi}{9}$$



$$\theta' = \pi - \frac{7\pi}{12}$$

$$\theta' = \frac{12\pi}{12} - \frac{7\pi}{12}$$

$$\theta' = \frac{5\pi}{12}$$

Objective: Find reference angles.

Assignment:

Log in to Office 365/Teams

Complete the assignment:

Reference Angles (Week 4, Day 1)

SHOW ALL YOUR WORK!

NO WORK = NO CREDIT