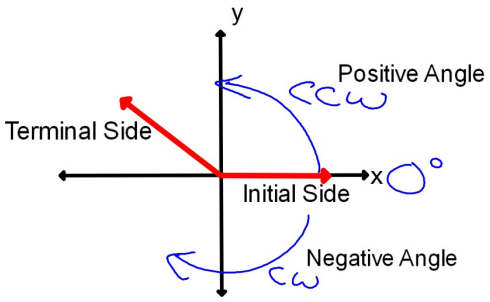
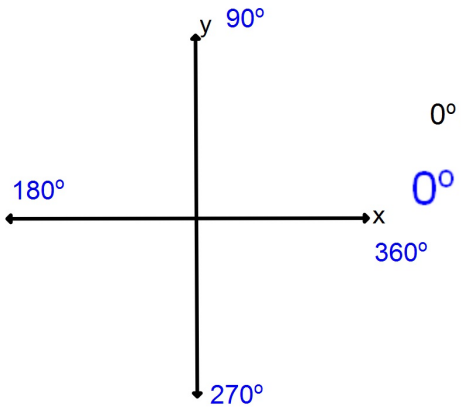
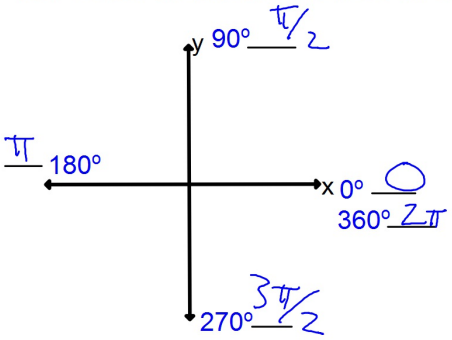
Angles in Standard Position:

Vertex is at the origin and
one ray is on the positive x-axis.



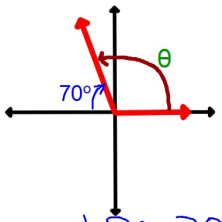


State the equivalent measure in radians
for each of the measures in degrees shown below.

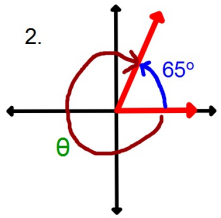


Give the measure of each angle θ that is in standard position.

1.

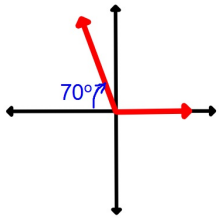


2.

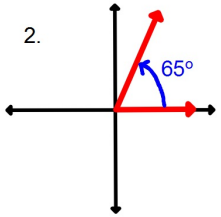


Give two other possible measures of each angle in standard position.

1.



2.



besides 110°

1. $110+360=470°$
2. $110+360+360=830°$

Besides $-295°$

1. $-295°-360°=-655°$
2. $-295°+360°=65°$

Coterminal Angles: Angles in standard position that have the same terminal side.

There are an infinite number of coterminal angles because every full turn (360°) in both a positive and a negative direction stops at the same spot (terminal side).

Find a positive and a negative coterminal angle for each given angle. add or subtract 360° as many times as you want or need to.

1. $\theta=800°$

Pos: you could add 360° once to get 1160°

Neg: you could subtract 360° three times to get -280°

2. $\theta= -70°$

Pos: you could add 360° once to get 290°

Neg: you could subtract 360° once to get -430°

Find a positive and a negative coterminal angle for each given angle. Give each answer in radians. Give fractional answers in reduced form.

add or subtract 2π as many times as you want or need to.

1. $\theta = \frac{8\pi}{3}$

pos $\frac{8\pi}{3}+2\pi$

$\frac{8\pi}{3}+\frac{6\pi}{3}=\frac{14\pi}{3}$

NEG $\frac{8\pi}{3}-\frac{6\pi}{3}=\frac{2\pi}{3}-\frac{6\pi}{3}=\frac{-4\pi}{3}$

2. $\theta = -\frac{13\pi}{6}$

pos $\frac{-13\pi}{6}+\frac{12\pi}{6}=\frac{-\pi}{6}$

$\frac{-\pi}{6}+\frac{12\pi}{6}=\frac{11\pi}{6}$

NEG $\frac{-13\pi}{6}-\frac{12\pi}{6}=\frac{-25\pi}{6}$

Find the measure of an angle between 0° and 360° that is coterminal to the given angle.

Add or subtract 360° until the angle is between 0° and 360°

1. 2215°

-360°
-360°
-360°
-360°
-360°
-360°
-360°
=55°

2. - 1720°

+360°
+360°
+360°
+360°
+360°
=80°

Find the measure of an angle between
0 and 2π that is coterminal to the given angle.
Give answer in radians. add or subtract 2π until the angle is between o and 2π

1. $\theta = \frac{32\pi}{7} - \frac{14\pi}{7}$

$= \frac{18\pi}{7} - \frac{14\pi}{7}$

$= \frac{4\pi}{7}$

2. $\theta = -\frac{27\pi}{4} + \frac{8\pi}{4} = -\frac{19\pi}{4}$

This is still negative so keep adding $8\pi/4$ until it becomes positive.

$\frac{5\pi}{4}$