Section 13-3

One full turn around a circle:

2π radians $= 360^\circ \longrightarrow \pi = 180^\circ$

To convert between radians and degrees use one of the following conversion factors: $\frac{\pi}{180^\circ}$ convert to radians or $\frac{180^\circ}{\pi}$ convert in to degrees

Length of an arc (S) equals the measure of the angle, in radians, times the radius. $S = \theta r$

Convert to degrees:

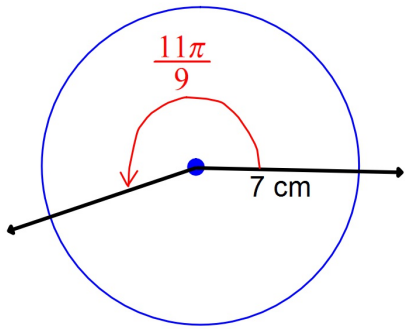
$\frac{7\pi}{12} \cdot \frac{180^\circ}{\pi} = 105^\circ$

Convert to radians:

$225^\circ \cdot \frac{\pi}{180^\circ} \div 45 \div 45$

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

Find the length of the intercepted arc to the nearest hundredth.



$S = \theta r$

$= \left(\frac{11\pi}{9}\right)(7\text{cm})$

$= 26.88\text{ cm}$

You can now finish Hwk #24:

Pages 729-730

Problems 1, 3-5, 7-10, 21, 22

Due tomorrow

Right triangle trigonometry involves angles with the following measures:

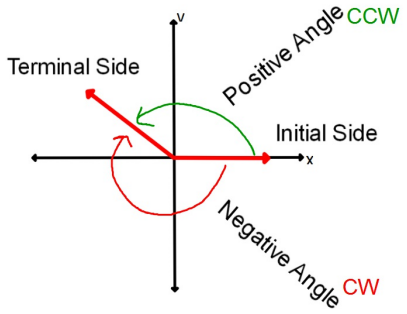
$0° < \theta < 90°$

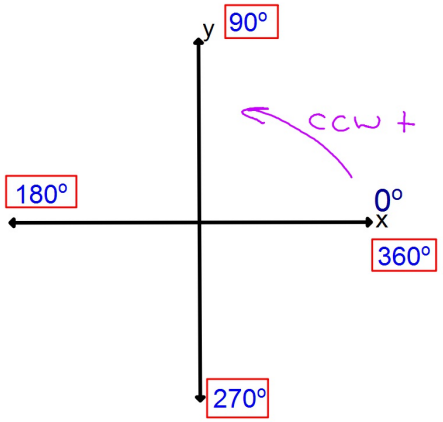
and using SOHCAHTOA

This means you were only able to find the Sin, Cos, and Tan of acute angles.

Angles in Standard Position:

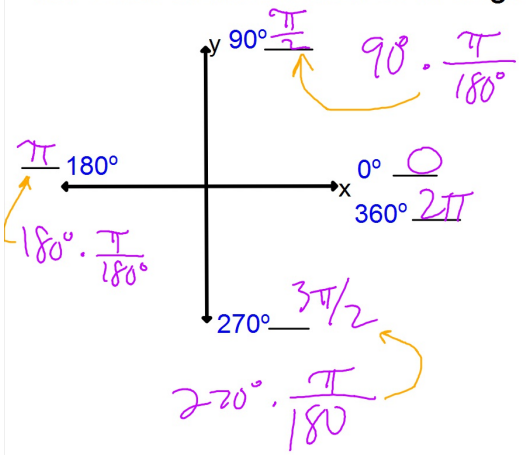
Vertex is at the origin and one ray is on the positive x-axis.





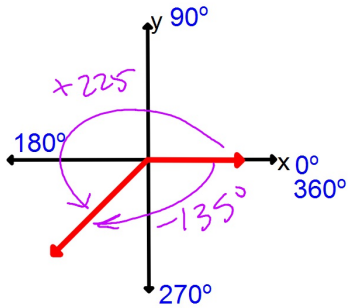
0° is the positive x-axis

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



The terminal side is in the middle of the third quadrant.
Give two possible measures for this angle.

θ= -135° θ= 225°



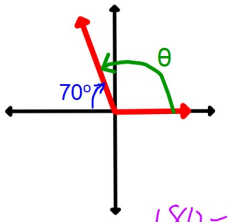
Can you give 2 more possible measures of this angle?

θ= 225+360 = 585°

θ= -135°-360° = -495°

Find the measure of each angle in standard position.

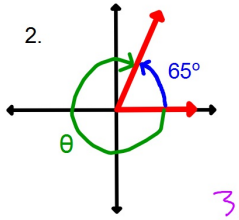
1.



180-70

θ= + 110°

2.

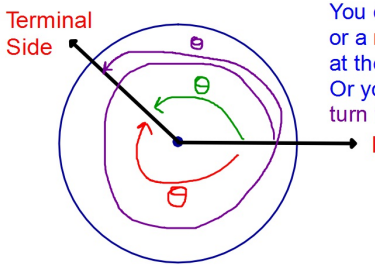


360 - 65

θ= — 295°

Coterminal Angles: Angles in Standard Position that have the same terminal side.

They start and stop in the same spot but aren't the same angle. How could this be?



You could either go in a positive or a negative direction and end up at the same Terminal side.
Or you can make more than one full turn then go until you reach the Terminal side location.

Find a positive and a negative coterminal angle for each given angle.

1. θ=800°

Pos: 80°, 1160°, 440°

Neg: -280°, -640°, ...

2. θ= -70°

Pos: 290°, 640, 1000 ....

Neg: -430, -790, ...

Find a positive and a negative coterminal angle for each given angle. Give each answer in radians and in terms of π. Reduce fractions.

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

Pos: $\frac{2\pi}{3}, \frac{14\pi}{3}, \frac{20\pi}{3}, \frac{26\pi}{3}$

$\frac{8\pi}{3} + 2\pi - \frac{8\pi}{3} + \frac{6\pi}{3}$

Neg: $-\frac{4\pi}{3}, -\frac{10\pi}{3}, \ldots$

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

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

$\frac{11\pi}{6}$

Neg: $-\frac{\pi}{6}, -\frac{25\pi}{6}$

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

to do this keep adding/subtracting 360° until you get an angle between 0° and 360°

1. 2215°

-1080

1135

-1080

$55°$

2. - 1720°

$+1080$

-640

$+720$

$80°$

Find the measure of an angle between 0 and 2π that is coterminal to the given angle.

to do this keep adding/subtracting 2π until you get an angle between 0 and 2π

1. $\theta = \frac{32\pi}{7} - \frac{14\pi}{7} = \frac{18\pi}{7} - \frac{14\pi}{7} = \boxed{\frac{4\pi}{7}}$

$2\pi = \frac{14\pi}{7}$

2. $\theta = -\frac{27\pi}{4} + \frac{8\pi}{4} = -\frac{19\pi}{4} + \frac{8\pi}{4} = -\frac{11\pi}{4} + \frac{8\pi}{4} = -\frac{3\pi}{4} + \frac{8\pi}{4} = \boxed{\frac{5\pi}{4}}$

$2\pi = \frac{8\pi}{4}$