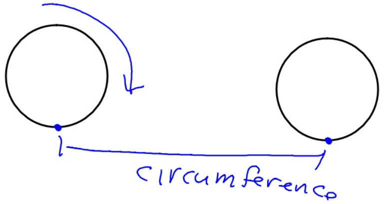
A semi truck tire has a diameter of 40 in. How far away will it roll if it makes 5 complete revolutions?

5 revolutions is how many radians?

$$\theta = 5(2\pi)$$

$$\theta = 10\pi$$




One full turn of a circle will move it a distance equal to its circumference (arc length).

$$S = \theta r$$

$$= 10\pi \cdot 20 \text{ in}$$

$$= 628.32 \text{ in}$$

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A pick-up tire has a radius of 16 inches. If you drive 7 miles, how many times does the tire rotate? Round to the nearest tenth.

Use this equation: $S = \theta r$

where S is the distance moved (arc length)

$$7\,\cancel{\text{mi}} \cdot \frac{5280\,\cancel{\text{ft}}}{1\,\cancel{\text{mi}}} \cdot \frac{12\text{in}}{1\,\cancel{\text{ft}}}$$

$$= 443520 \text{ in}$$

$$\frac{443520}{16} = \frac{\theta \cdot 16}{16}$$

$$27{,}720 = \theta$$

$$\#\text{ rev} = \frac{27{,}720}{2\pi}$$

$$4411.8 \text{ rev}$$

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A pick-up tire has a radius of 16 inches.

I put 170,000 miles on my truck before I got a new one.

How many times did the tires rotate while I had the truck?

Round to the nearest whole number.

$$\frac{170{,}000 \text{ mi} \cdot \frac{5280\text{ft}}{1\text{ mi}} \cdot \frac{12\text{in}}{1\text{ ft}}}{16\text{in}} = \frac{\theta \cdot 16\text{in}}{16\text{in}}$$

$$= \theta$$

divide this angle by $2\pi$ to turn this number of radians into number of revolutions.

$$107{,}143{,}108 = \frac{\theta}{2\pi} = \#\text{rev}$$

the truck tire turned this many times in 170,000 miles

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You can now finish Hwk #4:

Sec 13-3

Due tomorrow

Page 729

Problems: 2, 3, 5, 7, 8,10, 21, 22, 28a

Right triangle trigonometry involves angles with the following measures:

$0° < \theta < 90°$

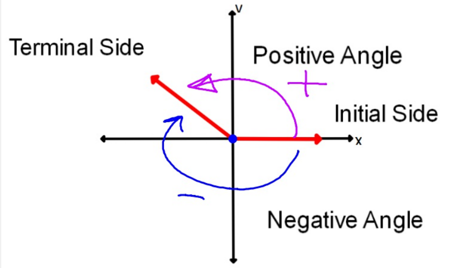
and using SOHCAHTOA

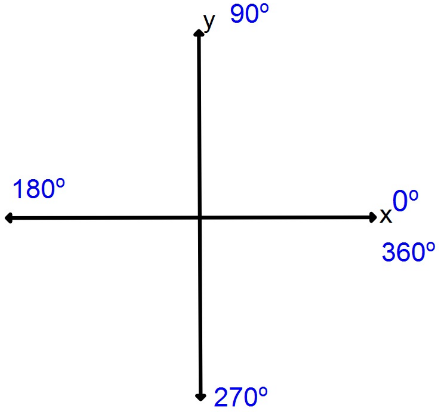
This means you were only able to find the Sin, Cos, and Tan of acute angles.

## Angles is Standard Position:

Vertex is at the origin.

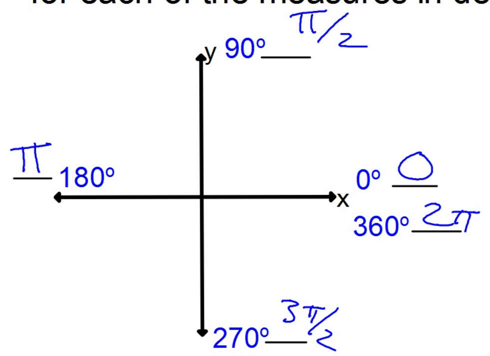
One of the rays (sides) is on the positive x-axis.



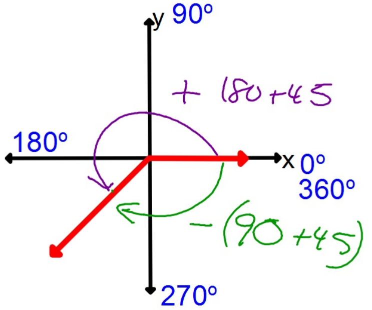

Location of 0° (starting point) is at the positive x-axis

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.

$\theta = 225^\circ$ $\theta = -135$




Can you give 2 more possible measures of this angle?

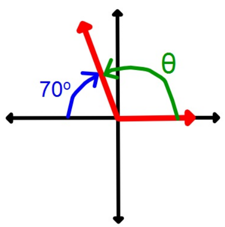
you can make one full turn in either the positive or negative direction then keep rotating until you get to the terminal side.

$\theta = 360+225 \Rightarrow 585^\circ$

$\theta = -360-135 = -495^\circ$

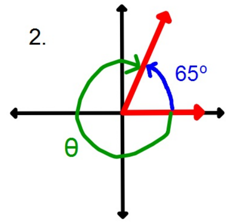
Find the measure of each Green angle in standard position.

1.




$\theta = 180-70$
$\theta = 110^\circ$

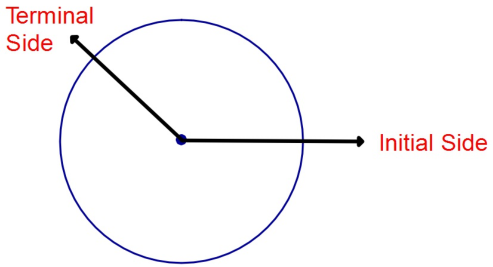
2.




$\theta = -(360-65^\circ)$
$\theta = -295^\circ$

## 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 make any number of full turns then continue rotating until you stop at the terminal side. In other words, the angle could be greater than 360°. Or you could move in a negative direction rather than a positive direction.

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

1. $\theta = 800^\circ$

2. $\theta = -430^\circ$

You can add or subtract 360° multiple times to get a coterminal angle. Possible answers are given.

**1.**

Pos:
subtracting 360 can give you : 80° & 440°
adding 360 can give you: 1160° ,1520° ,...

Neg:
You'll need to keep subtracting 360 to get: -280° you could keep subtracting 360 to get more negative coterminal angles.

**2.**

Pos:
You'll need to keep adding 360 to get: 290° you could keep adding 360 to get more positive coterminal angles.

Neg:
adding 360 can give you: -70°
subtracting can give you: -790° ,-1150° ...