

Warm Up

Determine the exact value of each of the following:

$$\sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$\cos 60^\circ = \frac{1}{2}$$

$$\tan 30^\circ = \frac{1}{\sqrt{3}} \text{ or } \frac{\sqrt{3}}{3}$$



Angle Terminology

Lesson objectives

- I know how to identify the following terms: Principal Angle, Coterminal Angle, Positive vs Negative Angles
- I know how to find the Related Acute Angle (RAA)
- I know how to draw a given angle and given related information

1.1

Lesson objectives

Teachers' notes

Lesson notes

Angle Terminology

We are going to base angles on the Cartesian Plane.

From here we will define the following:

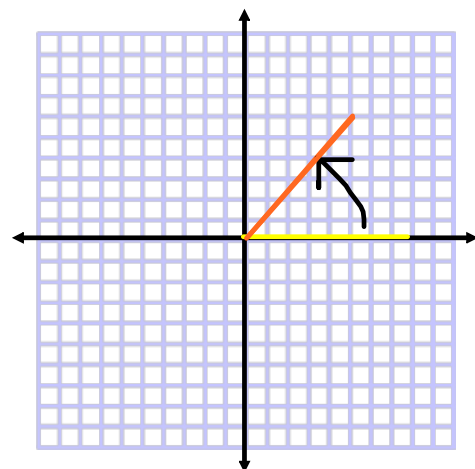
- Principal Angle
- Coterminal Angle
- Positive vs Negative Angle Measurements
- Related Acute Angles

Angle Terminology

Principal Angle

This is measured from the positive x-axis in a counter-clockwise direction

- The beginning position (the yellow line) is called the **INITIAL ARM**
- The end position (the orange line) is called the **TERMINAL ARM**



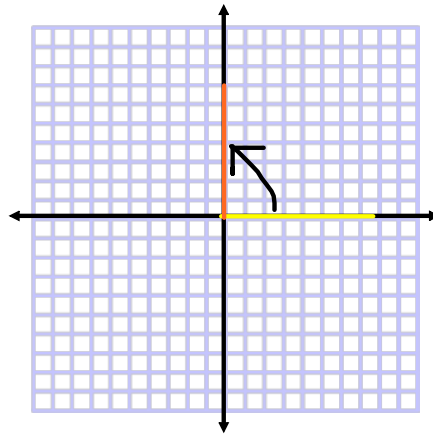


Angle Terminology

Measuring on the Cartesian Plane:

Starting at the positive x-axis (initial arm) and travelling to the positive y-axis (terminal arm) what is the measure of that angle?

Move for Answer



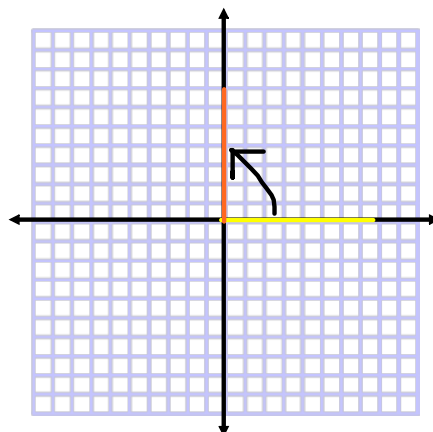
Angle Terminology



Measuring on the Cartesian Plane:

Starting at the positive x-axis (initial arm) and travelling to the positive y-axis (terminal arm) what is the measure of that angle?

90°

Move for Answer



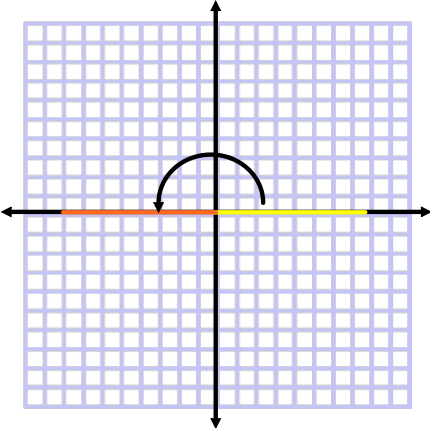




Angle Terminology



Measuring on the Cartesian Plane:

What about going around to the negative x-axis?

Move for Answer





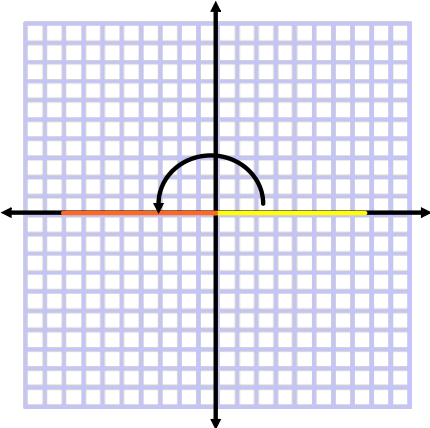
Angle Terminology


Measuring on the Cartesian Plane:

What about going around to the negative x-axis?

180°

Move for Answer





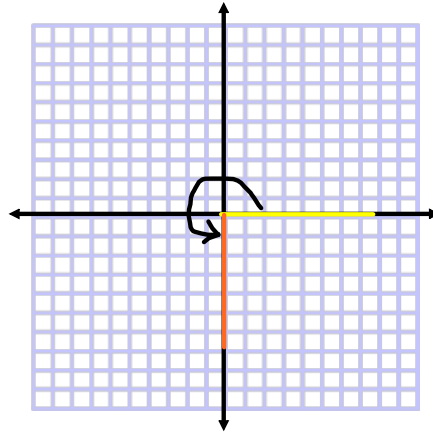


Angle Terminology

Measuring on the Cartesian Plane:

What about going to the negative y-axis?

Move for Answer



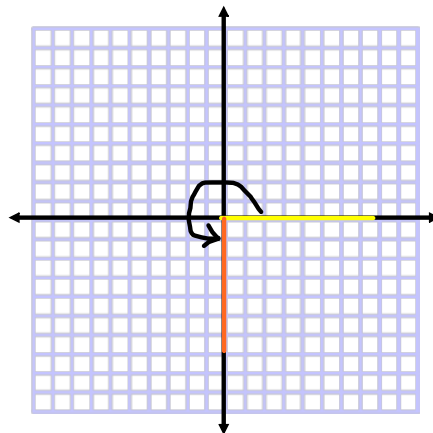
Angle Terminology



Measuring on the Cartesian Plane:

What about going to the negative y-axis?

270°

Move for Answer




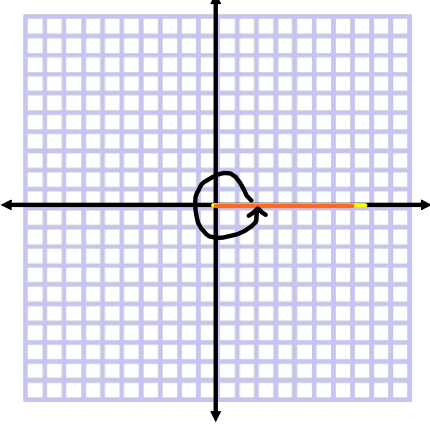
 


Angle Terminology



Measuring on the Cartesian Plane:

What if you go all of the way around?








 

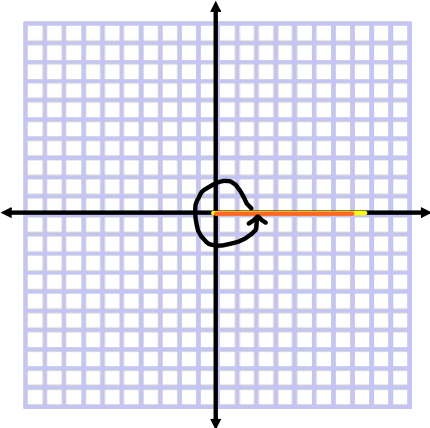
Angle Terminology


Measuring on the Cartesian Plane:

What if you go all of the way around?

360°





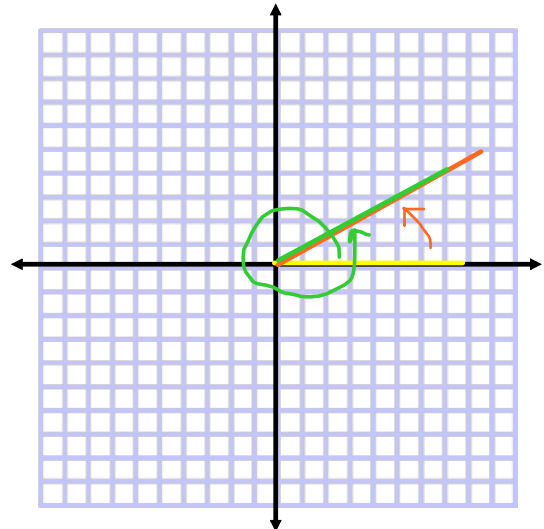


Angle Terminology

Coterminal Angle

Two angles whose terminal arm fall in the same place

- If we travel once around the "circle" we have travelled 360° .
- If we continue past this point we keep adding on.
- Therefore, if we go 30° past 360° we have gone 390°
- Therefore, since the terminal arm for the 30° angle is in the same position as the terminal arm for the 390° angle they are called coterminal angles.



To find coterminal angles, either subtract or add 360° to the first angle since this is "one trip" around the circle.

Angle Terminology

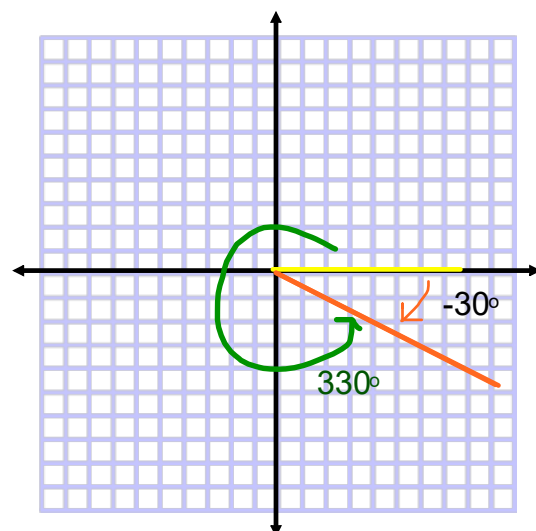
Negative Angle

An angle whose initial arm is on the positive x-axis and is measured in the CLOCKWISE direction

- To convert back to a positive angle you must add 360°

For example:

$$-30^\circ = -30^\circ + 360^\circ = 330^\circ$$



Angle Terminology

Related Acute Angle

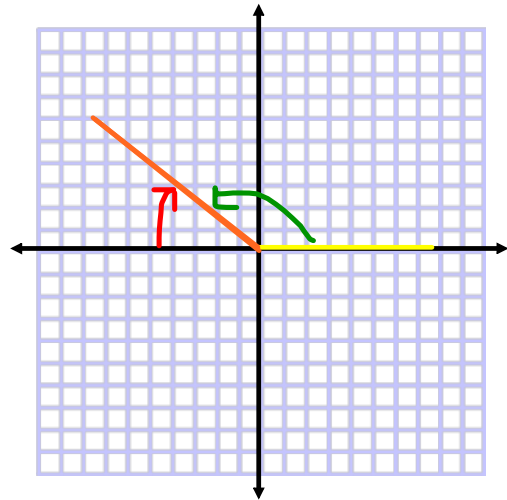
- always measured from the x-axis (positive or negative)
- direction can be clockwise or counter-clockwise
- always measured from the closest x-axis

Principal Angle

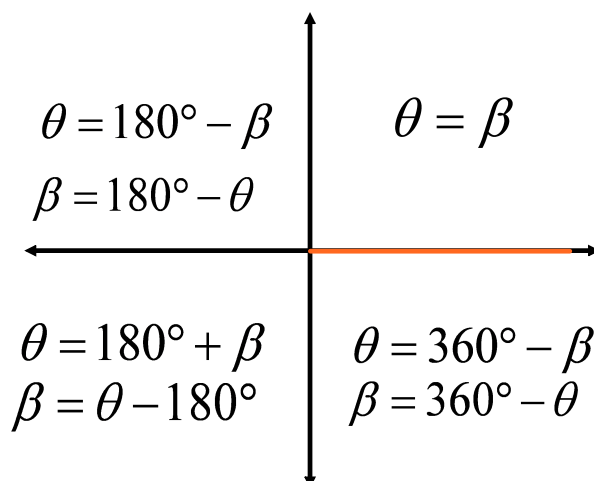
- 135°
- measured from the positive x-axis counter-clockwise

Related Acute Angle

- 45°
- measured from the negative x-axis clockwise

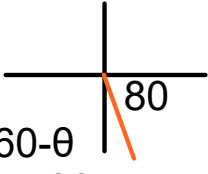


Calculating the Principal and Related Acute Angles

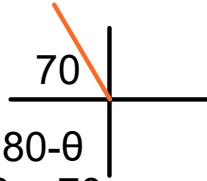


$\theta = \text{Principal Angle}$

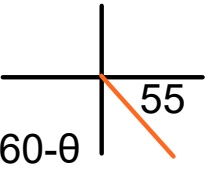
$\beta = \text{Related Acute Angle}$

**Example****Determine the related acute angle.**a) 280° 

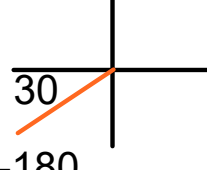
In quadrant 4
therefore, $\beta = 360 - \theta$
so, $\beta = 360 - 280 = 80$

b) 110° 

In quadrant 2
therefore, $\beta = 180 - \theta$
so, $\beta = 180 - 110 = 70$

c) 305° 

In quadrant 4
therefore, $\beta = 360 - \theta$
so, $\beta = 360 - 305 = 55$

d) 210° 

In quadrant 3
therefore, $\beta = \theta - 180$
so, $\beta = 210 - 180 = 30$

