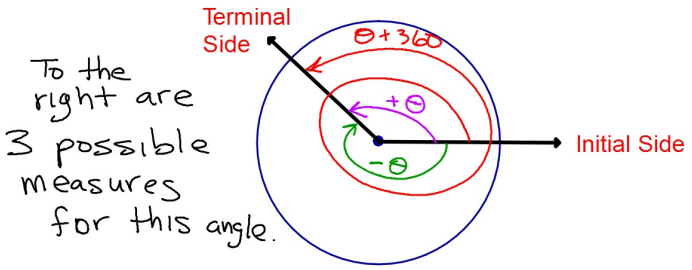
Coterminal Angles: Angles in Standard Position that have the same terminal side.

They start and stop in the same spot but aren't the same angle.



There are an infinite number of degrees that could represent this angle. More answer could be found by simply adding or subtracting 360° over and over again to/from one answer and you will find other answers.

Given any angle θ, in degrees, the first coterminal angle is ±360° away from the given angle.

every time you Rotate 360° or any multiple of 360°, in either the pos or neg direction you'll end up in the Same spot. (same terminal side)

1 full turn = 360°

Instead of adding/subtracting 360° again and again, you could add/subtract multiples of 360°.

2 full turns = 720°

3 full turns = 1080°

4 full turns = 1440°

etc.

Is 3110° coterminal with 230°?

Two angles, measured in degrees, are coterminal if....

the distance between them is a multiple of 360°

$3110° - 230° = 2880° \rightarrow \frac{2880°}{360} = 8$

Yes

3110° is 8 full turns away from 230° which means they are coterminal

o

the answer would obviously be NO if what were true?

if the two angles have a different one's digit they can't be coterminal

Is 3110° coterminal with 230°?

Another way to answer this is to start at 230° and keep adding 360° to see if you reach 3110° exactly.

$230 + 360 + 360 + 360 + 360 + 360 + 360 + 360 + 360 + 360 = 3110°$

Yes, they are coterminal.

Given any angle θ, in radians, the first coterminal angle is $\pm 2\pi$ away from the given angle.

every time you Rotate 2π or any multiple of 2π, in either the pos or neg direction you'll end up in the Same spot. (same terminal side)

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

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

You must add/subtract 2π in the form $\frac{6\pi}{3}$

Pos:

Subtract/add $\frac{6\pi}{3}$ $\Rightarrow \frac{2\pi}{3}, \ldots, \frac{14\pi}{3}, \frac{20\pi}{3}, \ldots$

Neg:

subtract $\frac{2\pi}{3}$ $\frac{-4\pi}{3}, \frac{-10\pi}{3}, \frac{-16\pi}{3} \ldots$

do this as many times as you need/want to.

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

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

Add/Subtract 2π in the form $\frac{12\pi}{6}$

Pos:

$+\frac{12\pi}{6} \rightarrow \frac{11\pi}{6}, \frac{23\pi}{6}, \frac{35\pi}{6}, \ldots$

Neg:

$+/-\frac{12\pi}{6} \rightarrow -\frac{\pi}{6}, \ldots, -\frac{25\pi}{6}, -\frac{37\pi}{6} \ldots$

do this as many times as you need/want to.

Is $-\frac{21\pi}{8}$ coterminal with $\frac{29\pi}{8}$?

Two angles, measured in radians, are coterminal if....

the distance between them is a multiple of 2π

$\frac{29\pi}{8} - -\frac{21\pi}{8} = \frac{50\pi}{8} = 6.25\pi$

This is NOT a multiple of 2π So they are NOT coterminal

Is $-\frac{21\pi}{8}$ coterminal with $\frac{29\pi}{8}$?

another way to answer this is to start at $-\frac{21\pi}{8}$ and keep adding 2π in the form $\frac{16\pi}{8}$ and See if you get $\frac{29\pi}{8}$ exactly

$-\frac{21\pi}{8} + \frac{16\pi}{8} = -\frac{5\pi}{8} + \frac{16\pi}{8} = \frac{11\pi}{8} + \frac{16\pi}{8} = \frac{27\pi}{8}$

you won't get $\frac{29\pi}{8}$ exactly so they are NOT coterminal

Are each pair of angles coterminal?

a) $-\frac{19\pi}{13}$ & $\frac{85\pi}{13}$

$\frac{85\pi}{13} - -\frac{19\pi}{13} = \frac{104\pi}{13}$

$= 8\pi$

This IS a multiple of 2π which means they ARE coterminal

b) $-\frac{41\pi}{7}$ & $\frac{50\pi}{7}$

$\frac{50\pi}{7} - -\frac{41\pi}{7} = \frac{91\pi}{7}$

$= 13\pi$

this is NOT a multiple of 2π so they are NOT coterminal

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

1. $\theta = 2215°$

-1080

$1135°$

-1080

$55°$

2. $\theta = -1720°$

$+1080$

-640

$+720$

$80°$