

Related Acute Angle  
Coterminal Angle

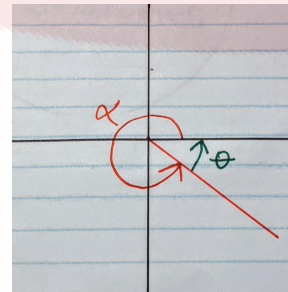
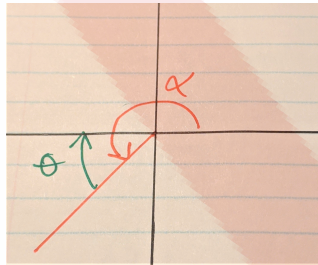
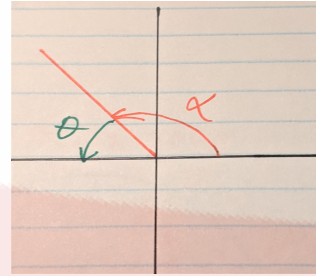
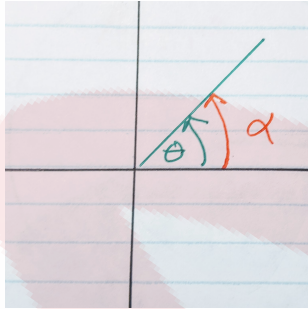
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2020

## Related acute angle

The **related acute angle** is an angle less than  $90^\circ$  that is found between the terminal arm and the x-axis when the terminal arm is in quadrant 2, 3 or 4. In the figures below, the green angle  $\theta$  is the *related acute angle* to the red angle  $\alpha$ .



### Example

For the following angles determine the related acute angle,

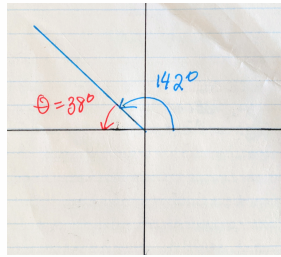
a)  $142^\circ$

b)  $225^\circ$

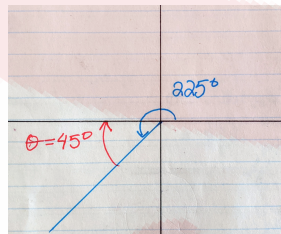
### Solution:

- a)  $142^\circ$  is in quadrant 2. So the related acute angle is the positive angle between the negative x-axis and the terminal arm. So,

$$\begin{aligned}\theta &= \text{related acute angle} \\ &= 180 - 142 \\ &= 38^\circ\end{aligned}$$

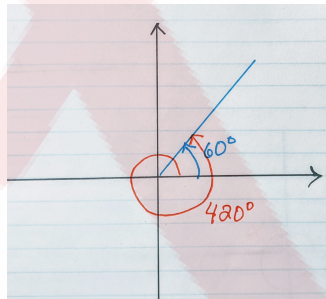


b)  $225^\circ$  is in the  $3^{rd}$  quadrant. So the related acute angle is,  $225 - 180 = 45^\circ$ .



## Coterminal angle

A **coterminal angle** is an angle measure that shares a terminal arm with another angle. In the figure below, the blue angle  $60^\circ$  is the given angle and the red angle  $420^\circ$  is the *coterminal angle* to the blue angle.



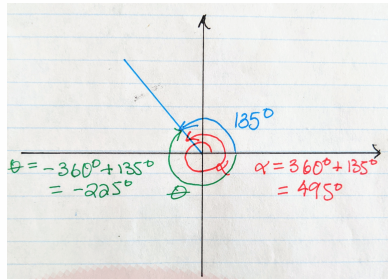
### Example

For the following angles determine at least 2 more coterminal angles.

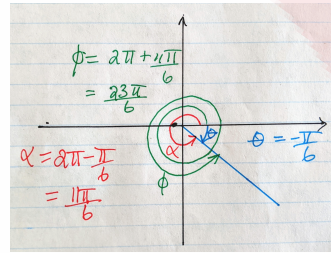
a)  $135^\circ$

b)  $\frac{5\pi}{6}$  radians

**Solution:**



a)



b)

## Exercises

1. For the following angles determine the related acute angle.

a)  $200^\circ$

f)  $\pi/3$  radians

b)  $112^\circ$

g)  $4\pi/3$  radians

c)  $300^\circ$

h)  $3\pi/4$  radians

d)  $-100^\circ$

e)  $57^\circ$

i)  $5\pi/3$  radians

j)  $7\pi/6$  radians

2. For the following angles provide two more coterminal angles.

a)  $30^\circ$

f)  $11\pi/8$  rad

b)  $\pi/12$  rad

g)  $5\pi/3$  rad

c)  $13\pi/15$  rad

h)  $90^\circ$

d)  $45^\circ$

i)  $115^\circ$

e)  $120^\circ$

j)  $\pi/6$  rad