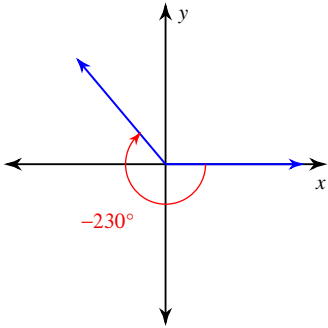


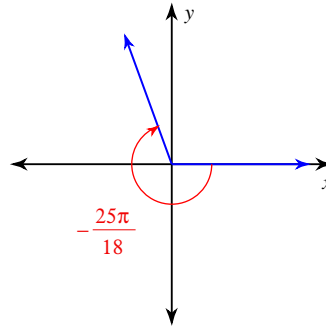
# Coterminal Angles and Reference Angles

**Find the reference angle.**

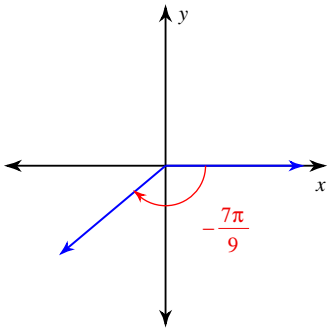
1)



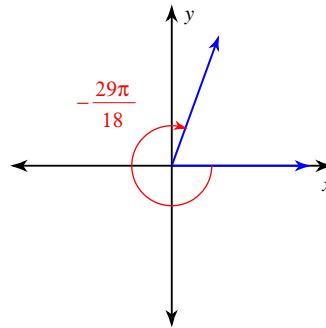
2)



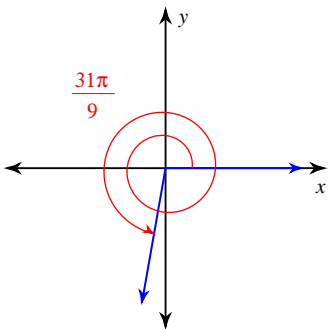
3)



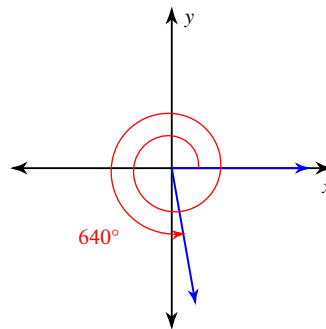
4)



5)



6)



7)  $-510^\circ$

8)  $-\frac{19\pi}{18}$

9)  $-\frac{13\pi}{12}$

10)  $-250^\circ$

**State if the given angles are coterminal.**

11)  $185^\circ, -545^\circ$

12)  $\frac{17\pi}{36}, \frac{161\pi}{36}$

**Find a coterminal angle between  $0^\circ$  and  $360^\circ$ .**

13)  $-330^\circ$

14)  $-435^\circ$

15)  $640^\circ$

16)  $-442^\circ$

**Find a coterminal angle between 0 and  $2\pi$  for each given angle.**

17)  $\frac{11\pi}{3}$

18)  $-\frac{35\pi}{18}$

19)  $\frac{15\pi}{4}$

20)  $-\frac{19\pi}{12}$

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

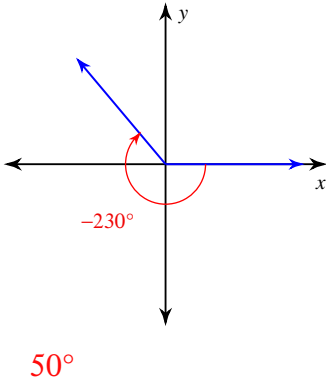
21)  $\frac{5\pi}{4}$

22)  $\frac{25\pi}{36}$

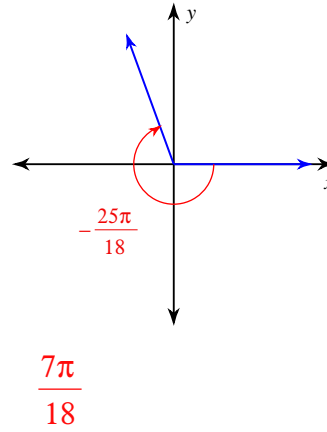
## Coterminal Angles and Reference Angles

Find the reference angle.

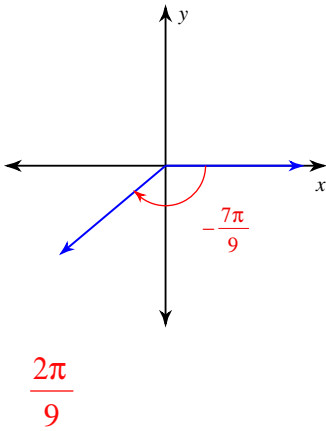
1)



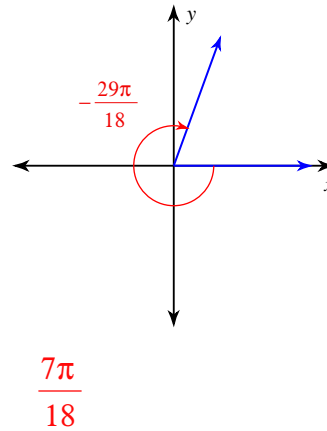
2)



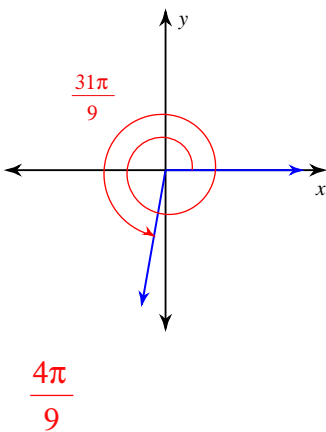
3)



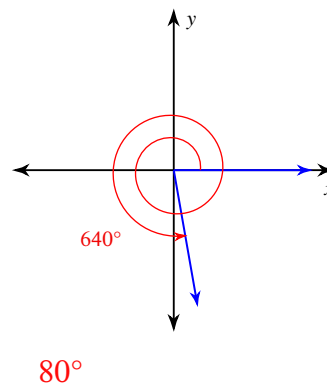
4)



5)



6)



7)  $-510^\circ$

$30^\circ$

8)  $-\frac{19\pi}{18}$

$\frac{\pi}{18}$

9)  $-\frac{13\pi}{12}$

$\frac{\pi}{12}$

10)  $-250^\circ$

$70^\circ$

State if the given angles are coterminal.

11)  $185^\circ, -545^\circ$

No

12)  $\frac{17\pi}{36}, \frac{161\pi}{36}$

Yes

Find a coterminal angle between  $0^\circ$  and  $360^\circ$ .

13)  $-330^\circ$

$30^\circ$

14)  $-435^\circ$

$285^\circ$

15)  $640^\circ$

$280^\circ$

16)  $-442^\circ$

$278^\circ$

Find a coterminal angle between 0 and  $2\pi$  for each given angle.

17)  $\frac{11\pi}{3}$

$\frac{5\pi}{3}$

18)  $-\frac{35\pi}{18}$

$\frac{\pi}{18}$

19)  $\frac{15\pi}{4}$

$\frac{7\pi}{4}$

20)  $-\frac{19\pi}{12}$

$\frac{5\pi}{12}$

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

21)  $\frac{5\pi}{4}$

$\frac{13\pi}{4}$  and  $-\frac{3\pi}{4}$

22)  $\frac{25\pi}{36}$

$\frac{97\pi}{36}$  and  $-\frac{47\pi}{36}$