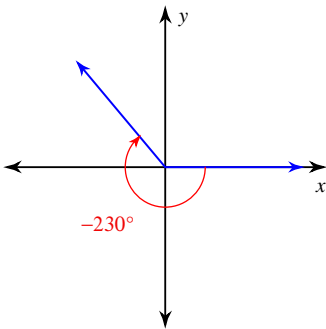


Coterminal Angles and Reference Angles

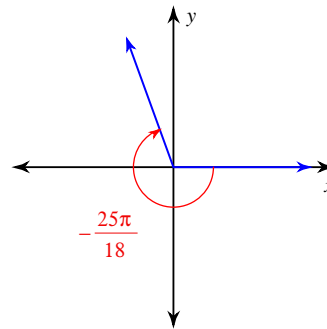
Date _____ Period _____

Find the reference angle.

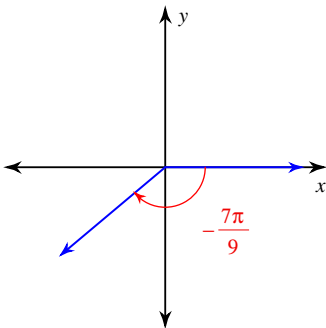
1)



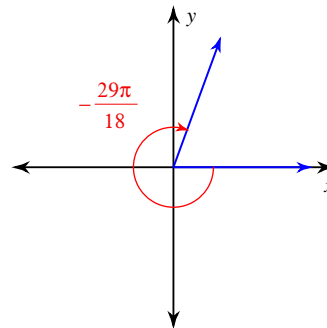
2)



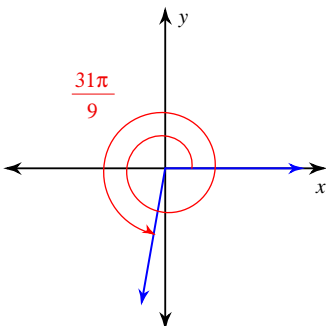
3)



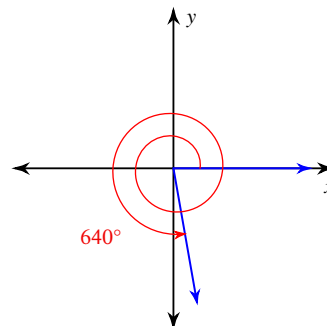
4)



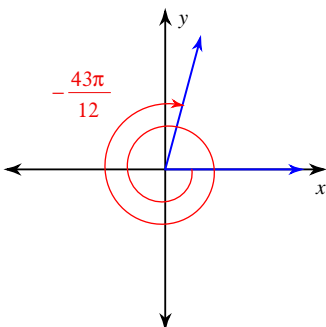
5)



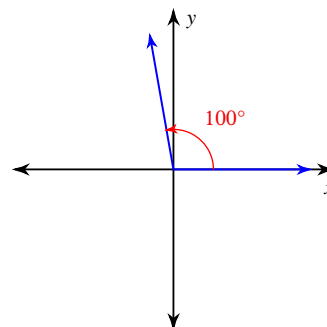
6)



7)



8)

9) -510° 10) $-\frac{19\pi}{18}$ 11) $-\frac{13\pi}{12}$ 12) -250°

13) $-\frac{5\pi}{6}$

14) $\frac{13\pi}{18}$

State if the given angles are coterminal.

15) $240^\circ, 600^\circ$

16) $90^\circ, 290^\circ$

17) $185^\circ, -545^\circ$

18) $\frac{41\pi}{36}, \frac{9\pi}{4}$

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

20) $\frac{7\pi}{9}, -\frac{25\pi}{9}$

Find a coterminal angle between 0° and 360° .

21) -330°

22) -435°

23) 640°

24) -442°

Find a coterminal angle between 0 and 2π for each given angle.

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

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

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

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

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

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

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

31) $-\frac{7\pi}{6}$

32) $\frac{29\pi}{45}$

33) $\frac{7\pi}{9}$

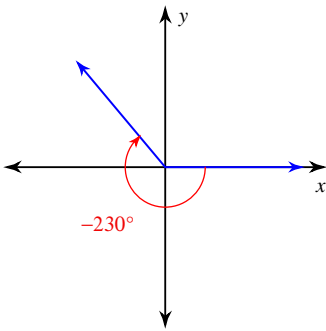
34) $\frac{3\pi}{4}$

Coterminal Angles and Reference Angles

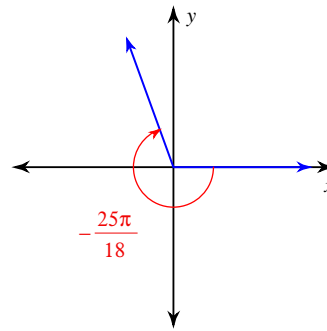
Date _____ Period _____

Find the reference angle.

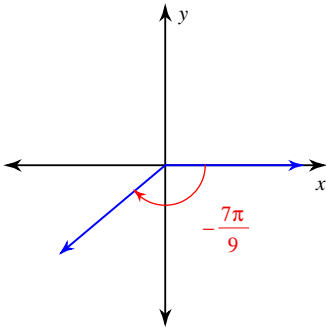
1) 50°



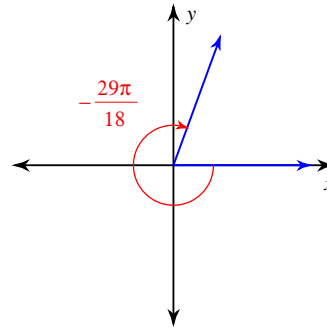
2) $\frac{7\pi}{18}$



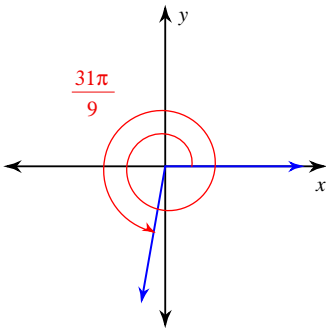
3) $\frac{2\pi}{9}$



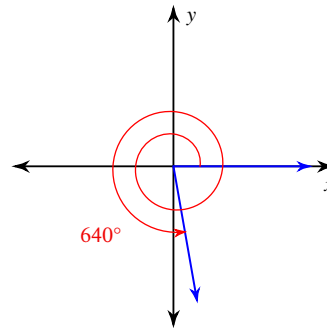
4) $\frac{7\pi}{18}$



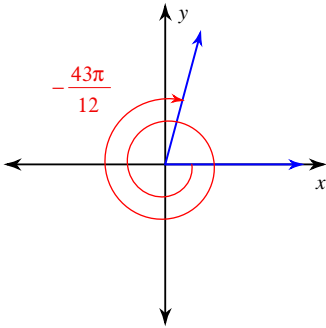
5) $\frac{4\pi}{9}$



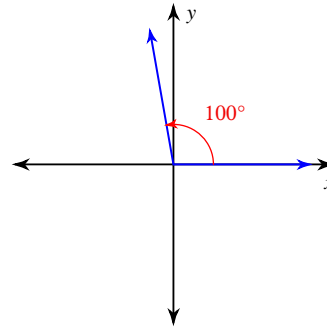
6) 80°



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



8) 80°



9) -510° 30°

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

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

12) -250° 70°

$$13) -\frac{5\pi}{6} \quad \frac{\pi}{6}$$

$$14) \frac{13\pi}{18} \quad \frac{5\pi}{18}$$

State if the given angles are coterminal.

$$15) 240^\circ, 600^\circ$$

Yes

$$16) 90^\circ, 290^\circ$$

No

$$17) 185^\circ, -545^\circ$$

No

$$18) \frac{41\pi}{36}, \frac{9\pi}{4}$$

No

$$19) \frac{17\pi}{36}, \frac{161\pi}{36}$$

Yes

$$20) \frac{7\pi}{9}, -\frac{25\pi}{9}$$

No

Find a coterminal angle between 0° and 360° .

$$21) -330^\circ$$

30°

$$22) -435^\circ$$

285°

$$23) 640^\circ$$

280°

$$24) -442^\circ$$

278°

Find a coterminal angle between 0 and 2π for each given angle.

$$25) \frac{11\pi}{3} \quad \frac{5\pi}{3}$$

$$26) -\frac{35\pi}{18} \quad \frac{\pi}{18}$$

$$27) \frac{15\pi}{4} \quad \frac{7\pi}{4}$$

$$28) -\frac{19\pi}{12} \quad \frac{5\pi}{12}$$

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

$$29) \frac{5\pi}{4}$$

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

$$30) \frac{25\pi}{36} \quad \frac{97\pi}{36} \text{ and } -\frac{47\pi}{36}$$

$$31) -\frac{7\pi}{6}$$

$$\frac{5\pi}{6} \text{ and } -\frac{19\pi}{6}$$

$$32) \frac{29\pi}{45} \quad \frac{119\pi}{45} \text{ and } -\frac{61\pi}{45}$$

$$33) \frac{7\pi}{9}$$

$$\frac{25\pi}{9} \text{ and } -\frac{11\pi}{9}$$

$$34) \frac{3\pi}{4} \quad \frac{11\pi}{4} \text{ and } -\frac{5\pi}{4}$$