

## 三角関数の性質

1  $\theta + 2n\pi$ 

$$\begin{aligned}\sin(\theta + 2n\pi) &= \sin \theta \\ \cos(\theta + 2n\pi) &= \cos \theta \\ \tan(\theta + 2n\pi) &= \tan \theta\end{aligned}$$

2  $-\theta$ 

$$\begin{aligned}\sin(-\theta) &= -\sin \theta \\ \cos(-\theta) &= \cos \theta \\ \tan(-\theta) &= -\tan \theta\end{aligned}$$

3  $\theta + \frac{\pi}{2}$ 

$$\begin{aligned}\sin(\theta + \frac{\pi}{2}) &= \cos \theta \\ \cos(\theta + \frac{\pi}{2}) &= -\sin \theta \\ \tan(\theta + \frac{\pi}{2}) &= -\frac{1}{\tan \theta}\end{aligned}$$

4  $\theta + \pi$ 

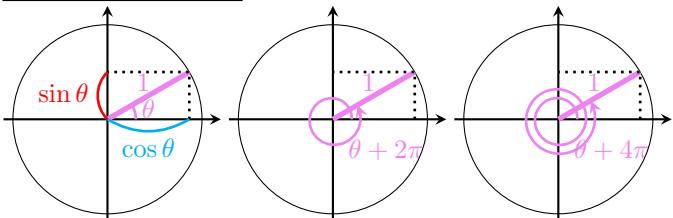
$$\begin{aligned}\sin(\theta + \pi) &= -\sin \theta \\ \cos(\theta + \pi) &= -\cos \theta \\ \tan(\theta + \pi) &= \tan \theta\end{aligned}$$

5  $\frac{\pi}{2} - \theta$ 

$$\begin{aligned}\sin(\frac{\pi}{2} - \theta) &= \cos \theta \\ \cos(\frac{\pi}{2} - \theta) &= \sin \theta \\ \tan(\frac{\pi}{2} - \theta) &= \frac{1}{\tan \theta}\end{aligned}$$

6  $\pi - \theta$ 

$$\begin{aligned}\sin(\pi - \theta) &= \sin \theta \\ \cos(\pi - \theta) &= -\cos \theta \\ \tan(\pi - \theta) &= -\tan \theta\end{aligned}$$

1  $\theta + 2n\pi$  の場合

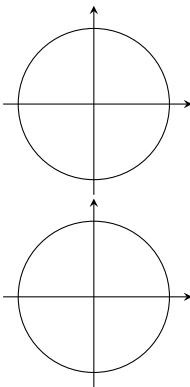
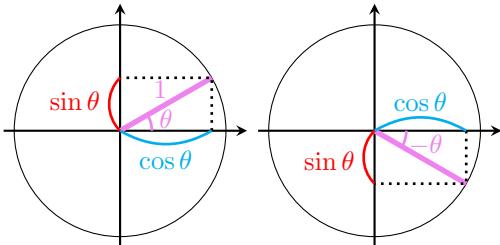
何回転かしてから、θだけ進めば、動径がθと同じになる。

$$\begin{aligned}\sin(\theta + 2n\pi) &= \sin \theta \\ \cos(\theta + 2n\pi) &= \cos \theta \\ \tan(\theta + 2n\pi) &= \tan \theta\end{aligned}$$

例 1  $\cos \frac{14}{3}\pi$  の値を求めよ。

問 1 次の値を求めよ。

(1)  $\sin \frac{15}{4}\pi$  (2)  $\tan \frac{41}{6}\pi$

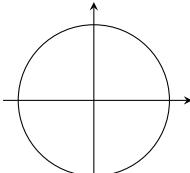
2  $-\theta$  の場合

角が正負反転すれば、高さ・傾きが正負で反転。

$\sin(-\theta) = -\sin \theta$

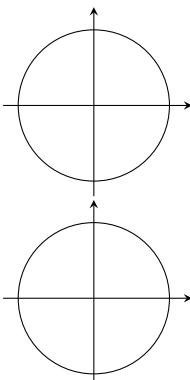
$\cos(-\theta) = \cos \theta$

$\tan(-\theta) = -\tan \theta$

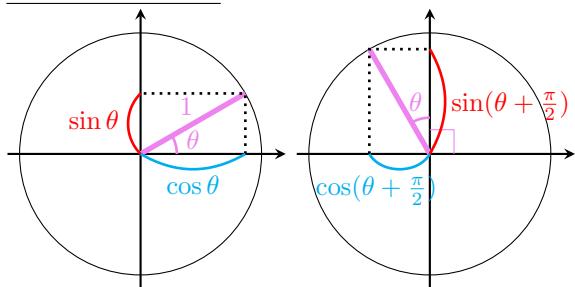
例 2  $\sin(-\frac{\pi}{3})$  を求めよ。

問 2 次の値を求めよ。

(1)  $\cos(-\frac{5}{6}\pi)$  (2)  $\tan(-\frac{1}{4}\pi)$



**3**  $\theta + \frac{\pi}{2}$  の場合

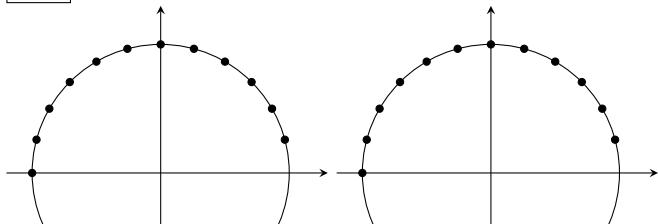


$$\sin(\theta + \frac{\pi}{2}) = \cos \theta$$

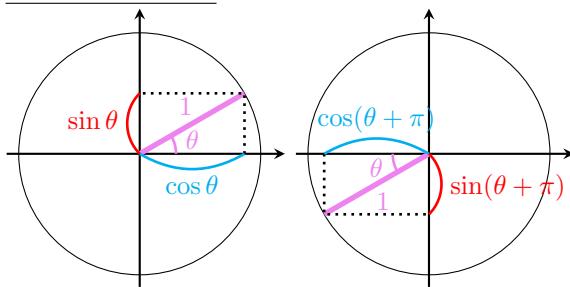
$$\cos(\theta + \frac{\pi}{2}) = -\sin \theta$$

$$\tan(\theta + \frac{\pi}{2}) = -\frac{1}{\tan \theta}$$

**例 3**  $\sin \frac{5}{12}\pi = a$  とするとき、 $\cos \frac{11}{12}\pi$  の値を  $a$  で表せ。



**4**  $\theta + \pi$  の場合



$$\sin(\theta + \pi) = -\sin \theta$$

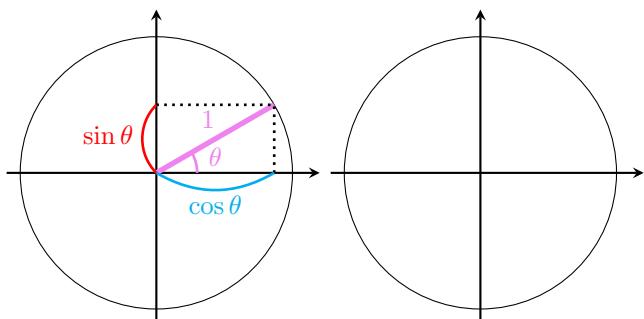
$$\cos(\theta + \pi) = -\cos \theta$$

$$\tan(\theta + \pi) = \tan \theta$$

**例 4** 単位円を用い、次の公式が成り立つことを図示せよ。

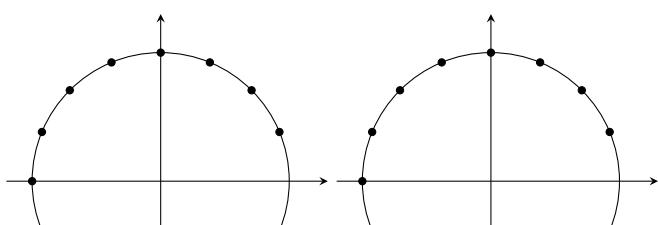
$$\sin(\frac{\pi}{2} - \theta) = \cos \theta$$

$$\cos(\frac{\pi}{2} - \theta) = \sin \theta$$



**問 3**  $\cos \frac{\pi}{8} = a$  とおくとき、次の値を  $a$  で表せ。

$$(1) \quad \sin \frac{5}{8}\pi \quad (2) \quad \cos \frac{5}{8}\pi$$

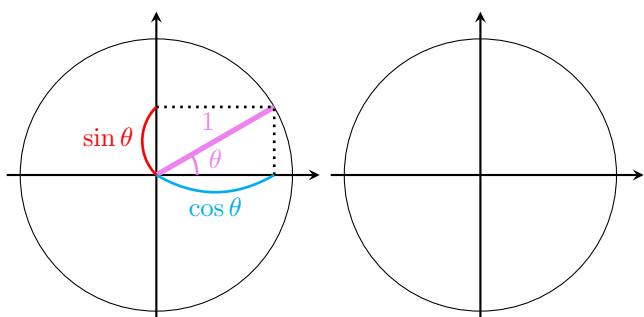


**問 4** 単位円を用い、次の公式が成り立つことを図示せよ。

$$\sin(\pi - \theta) = \sin \theta$$

$$\cos(\pi - \theta) = -\cos \theta$$

$$\tan(\pi - \theta) = -\tan \theta$$



答  $\sin \frac{5}{8}\pi = \quad , \quad \cos \frac{5}{8}\pi = \quad$

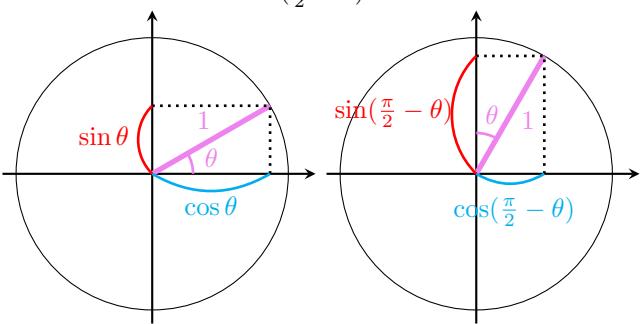


例 4

単位円を用い、次の公式が成り立つことを図示せよ。

$$\sin\left(\frac{\pi}{2} - \theta\right) = \cos \theta$$

$$\cos\left(\frac{\pi}{2} - \theta\right) = \sin \theta$$



問 4

単位円を用い、次の公式が成り立つことを図示せよ。

$$\sin(\pi - \theta) = \sin \theta$$

$$\cos(\pi - \theta) = -\cos \theta$$

$$\tan(\pi - \theta) = -\tan \theta$$

