

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 $\theta + \pi$

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

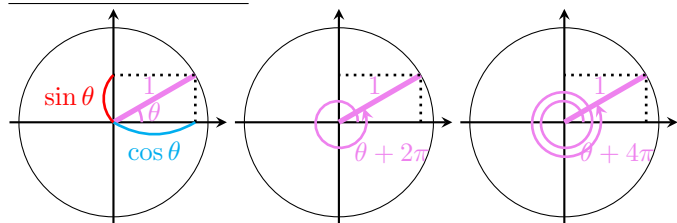
5 $\frac{\pi}{2} - \theta$

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

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



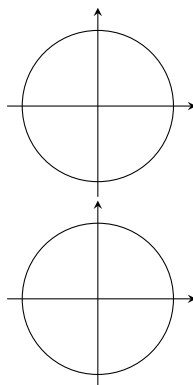
何回転かしてから、 θ だけ進めば、動径が θ と同じになる。

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

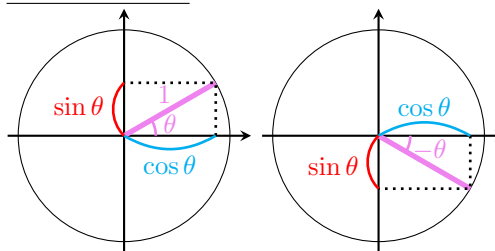
例 1 $\cos \frac{14}{3}\pi$ の値を求めよ。

問 1 次の値を求めよ。

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



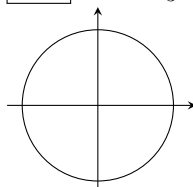
2 $-\theta$ の場合



角が正負反転すれば、高さ・傾きが正負で反転。

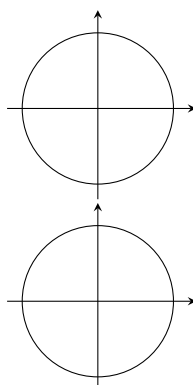
$$\begin{aligned}\sin(-\theta) &= -\sin \theta \\ \cos(-\theta) &= \cos \theta \\ \tan(-\theta) &= -\tan \theta\end{aligned}$$

例 2 $\sin(-\frac{\pi}{3})$ を求めよ。

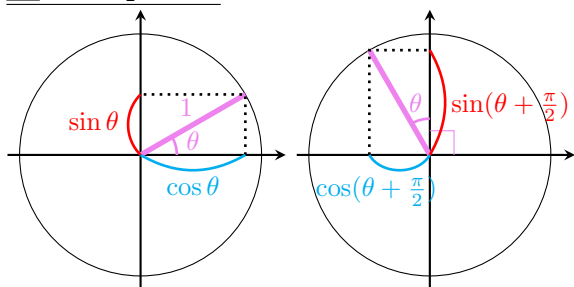


問 2 次の値を求めよ。

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



3 $\theta + \frac{\pi}{2}$ の場合

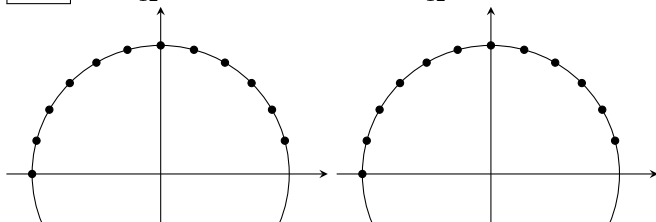


$$\sin(\theta + \frac{\pi}{2}) = \cos \theta$$

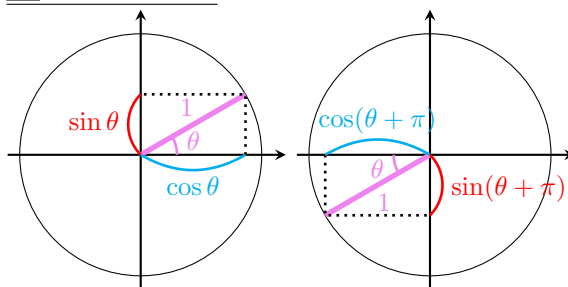
$$\cos(\theta + \frac{\pi}{2}) = -\sin \theta$$

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

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



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

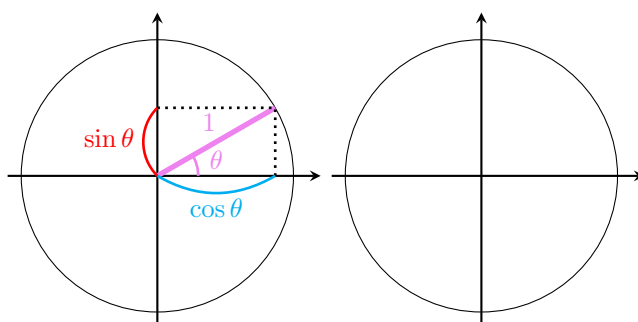
$$\cos(\theta + \pi) = -\cos \theta$$

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

例 4 単位円を用い、次の公式が成り立つことを図示せよ。

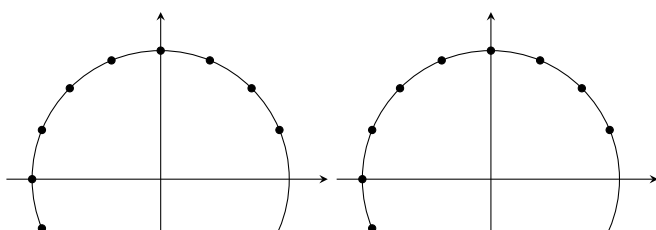
$$\sin(\frac{\pi}{2} - \theta) = \cos \theta$$

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



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

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

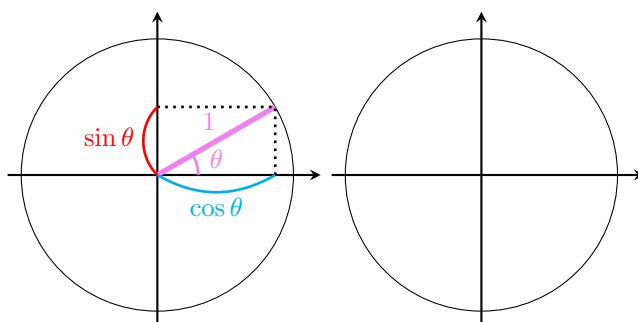


問 4 単位円を用い、次の公式が成り立つことを図示せよ。

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

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

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

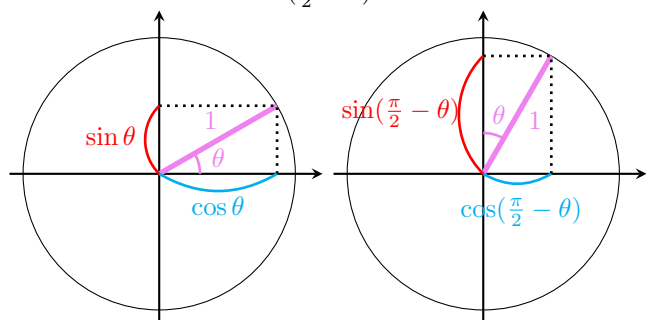


答 $\sin \frac{5}{8}\pi =$, $\cos \frac{5}{8}\pi =$

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。

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

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

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

