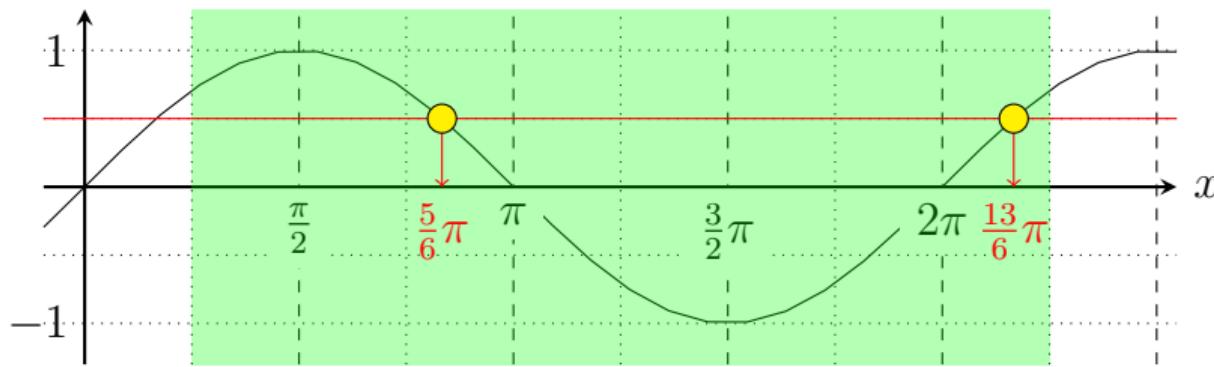


三角関数

1400. 三角方程式

$0 \leq \theta < 2\pi$ のとき、
 $\sin(\theta + \frac{\pi}{4}) = \frac{1}{2}$ を満たす θ を求めよ。



今回の学習目標

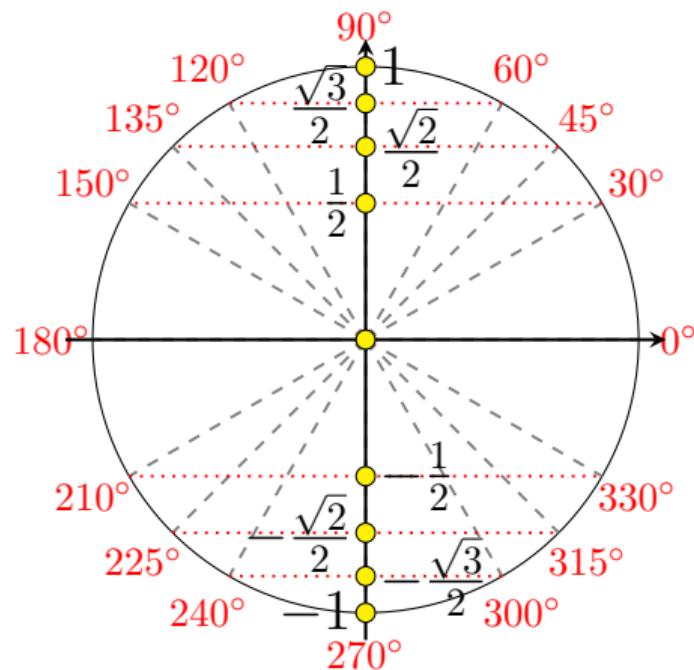
三角方程式を解く

- グラフを活用して、値から角を逆算する。

$$\sin \theta = -\frac{\sqrt{3}}{2}$$

$$\sin \theta = -\frac{\sqrt{3}}{2}$$

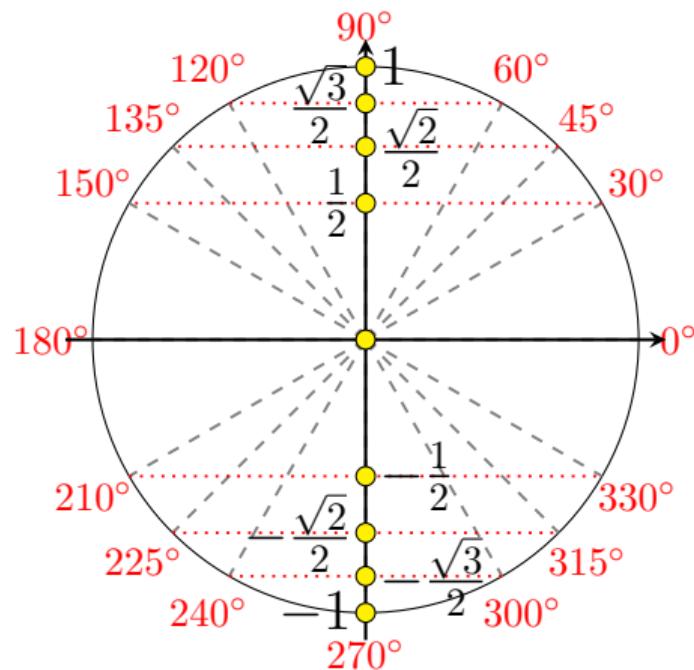
サインは y 座標



$$\sin \theta = -\frac{\sqrt{3}}{2}$$

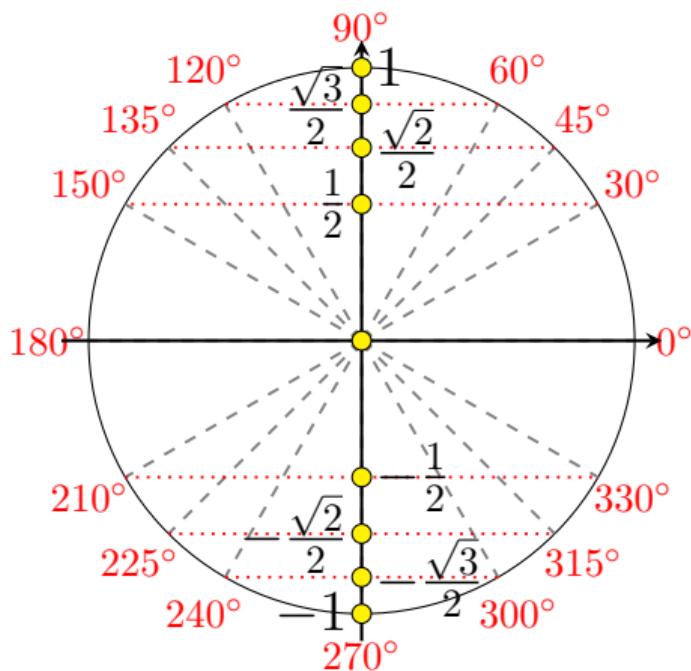
$$\cos \theta = -\frac{\sqrt{3}}{2}$$

サインは y 座標



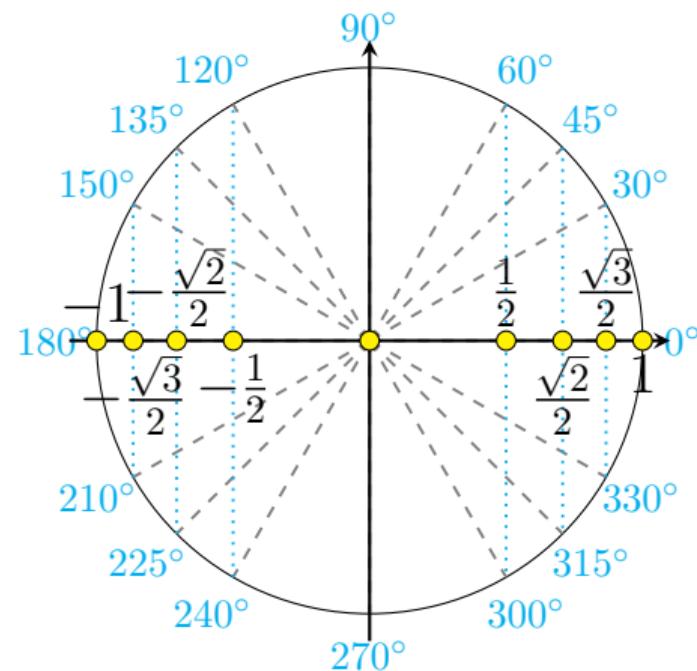
$$\sin \theta = -\frac{\sqrt{3}}{2}$$

サインは y 座標



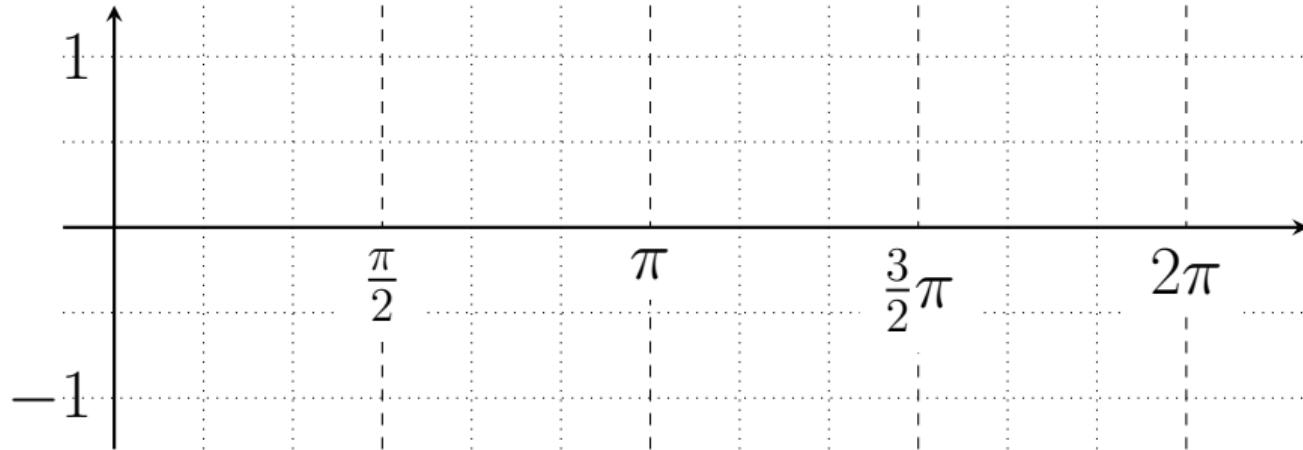
$$\cos \theta = -\frac{\sqrt{3}}{2}$$

コサインは x 座標



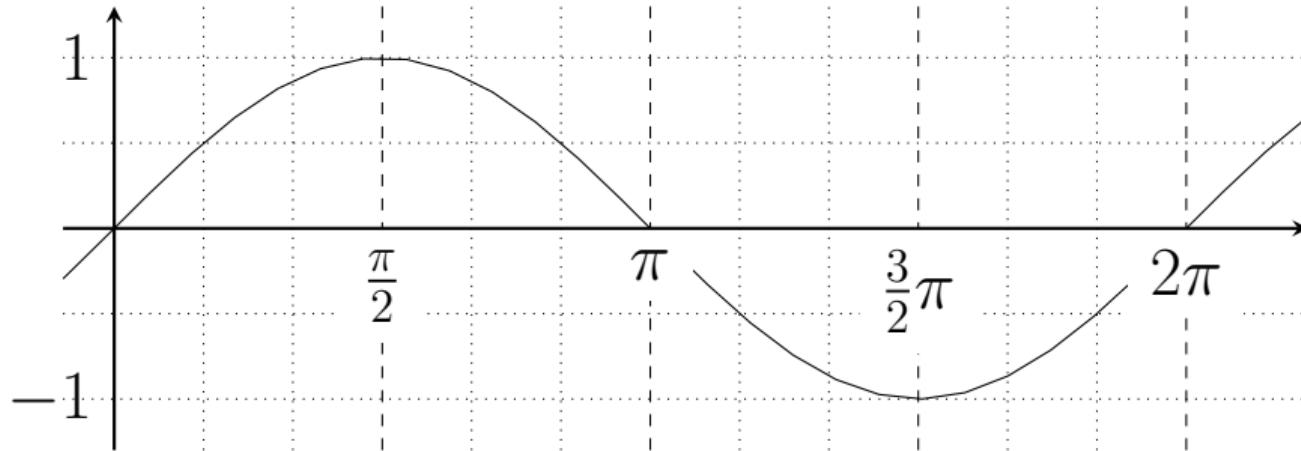
例 1

方程式 $\sin \theta = -\frac{1}{2}$ を満たす θ の値を求めよ。



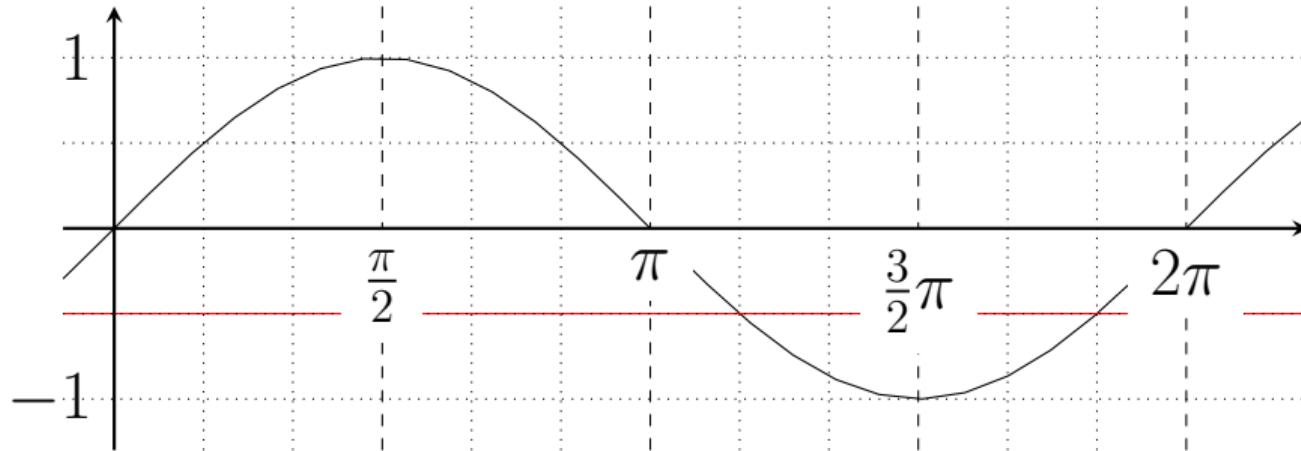
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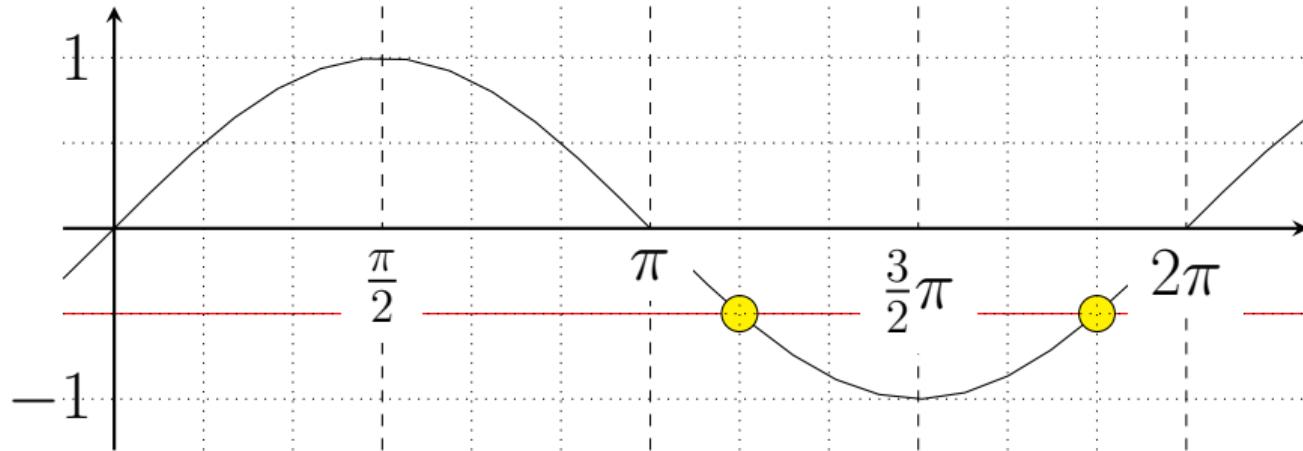
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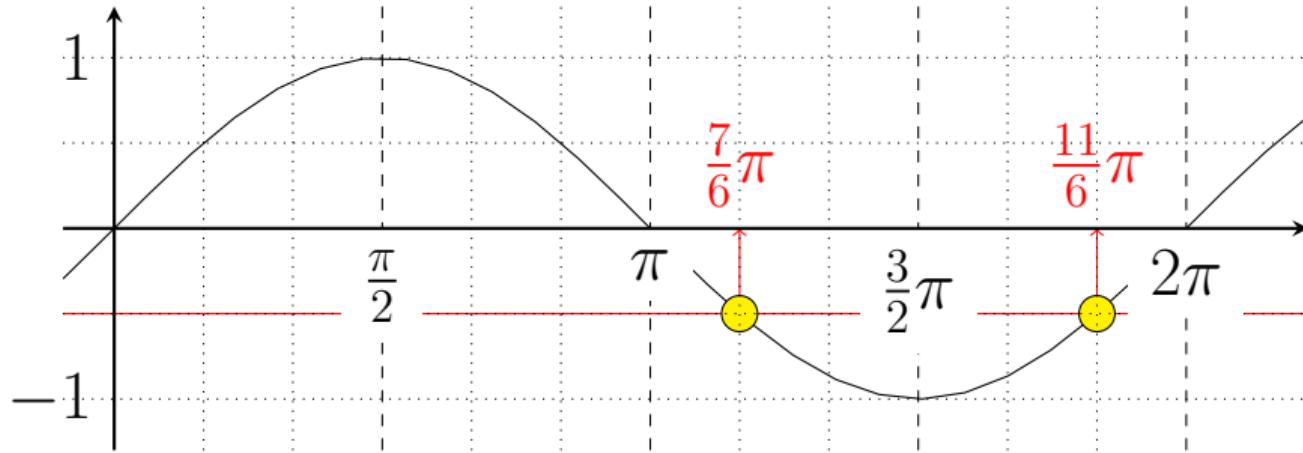
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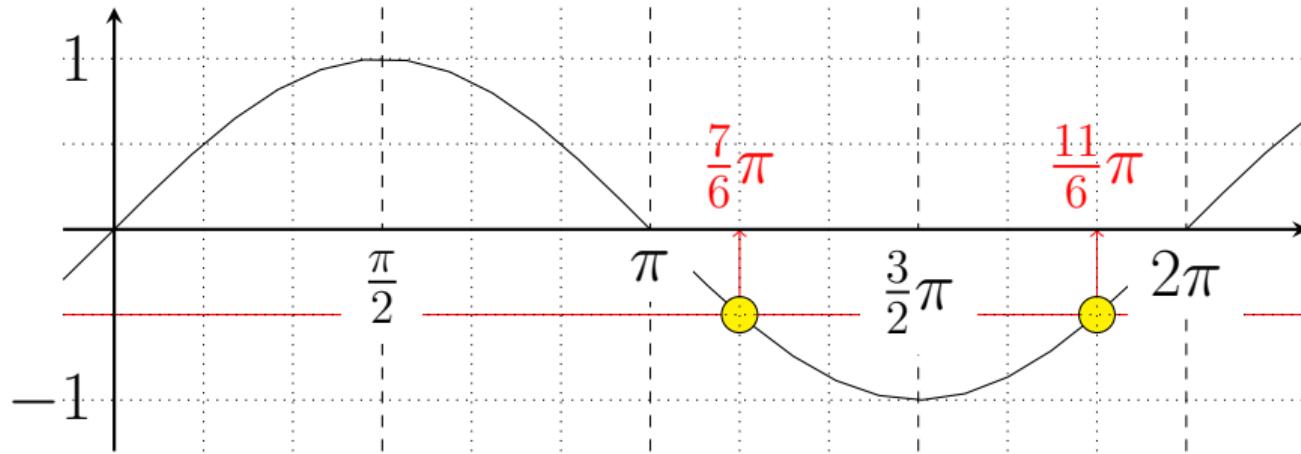
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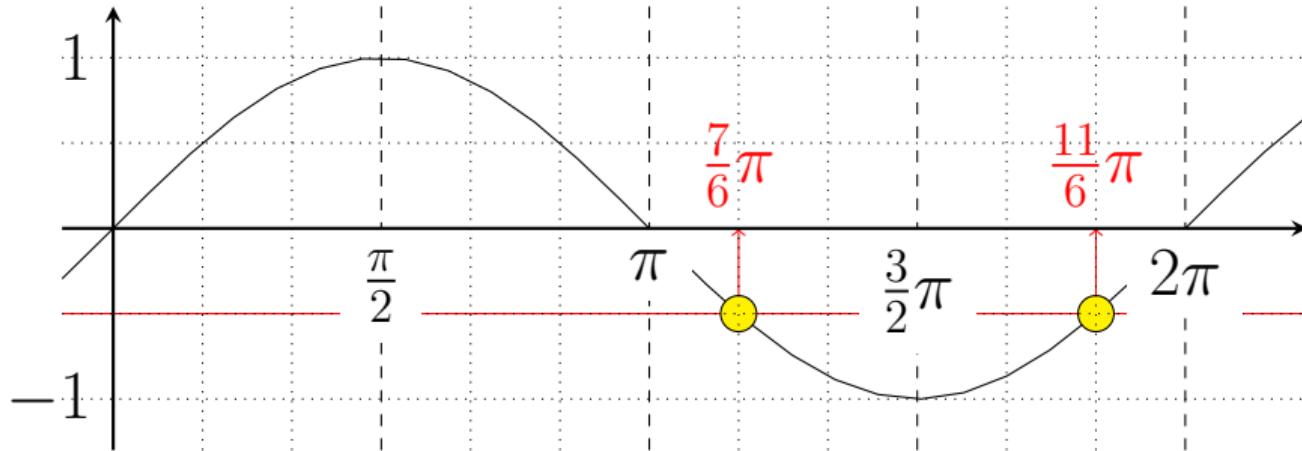
答

$$\frac{7}{6}\pi + 2n\pi,$$

(n は整数)

例 1

方程式 $\sin \theta = -\frac{1}{2}$ を満たす θ の値を求めよ。



答 $\frac{7}{6}\pi + 2n\pi, \quad \frac{11}{6}\pi + 2n\pi \quad (n \text{ は整数})$

ビデオを止めて問題を解いてみよう

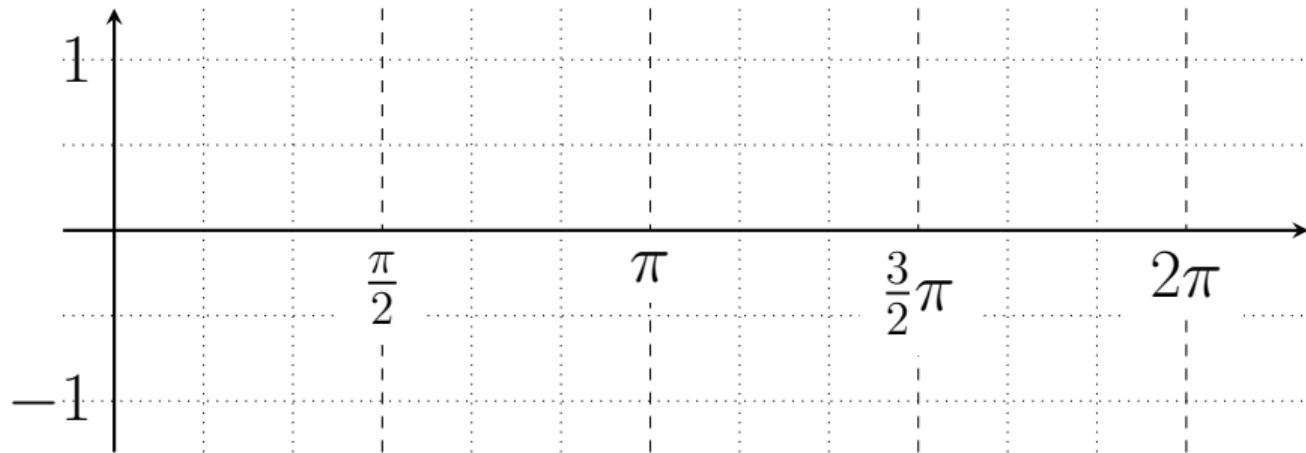
問 1 次の方程式を満たす θ の値を求めよ。

$$(1) \quad \sin \theta = \frac{\sqrt{3}}{2}$$

$$(2) \quad 2 \cos \theta = \sqrt{2}$$

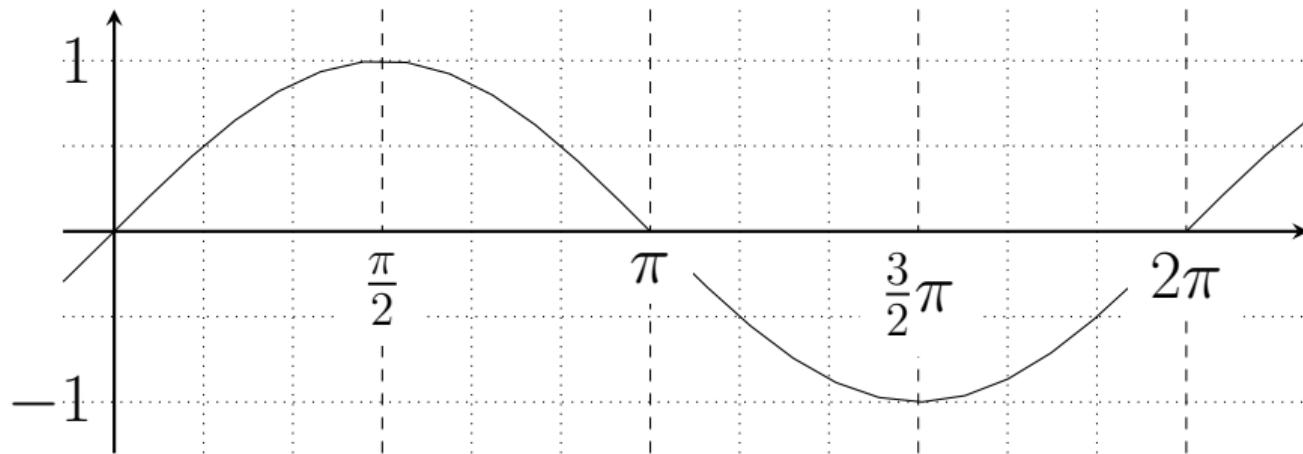
問 1

(1) $\sin \theta = \frac{\sqrt{3}}{2}$



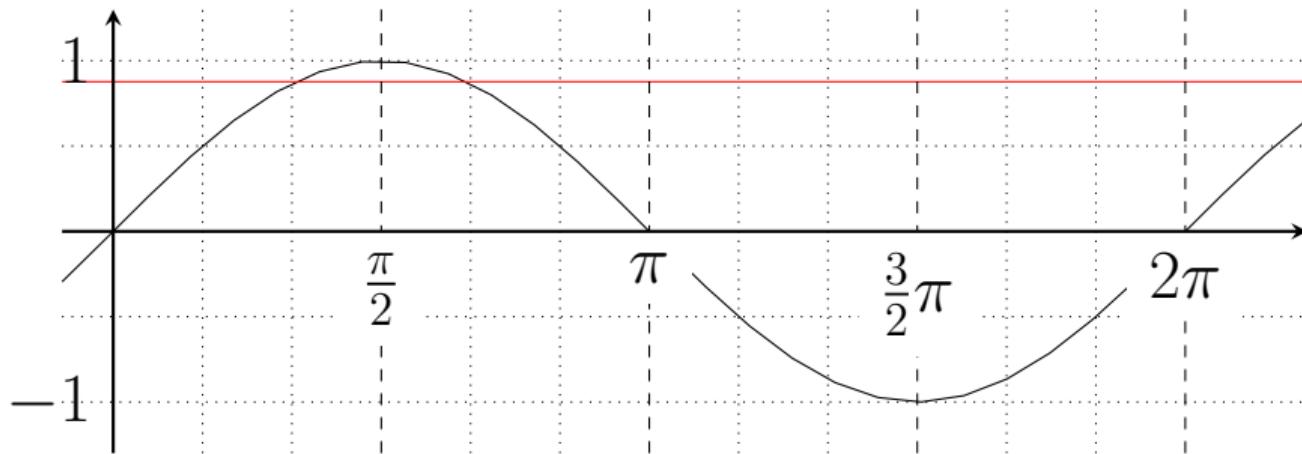
問 1

$$(1) \quad \sin \theta = \frac{\sqrt{3}}{2}$$



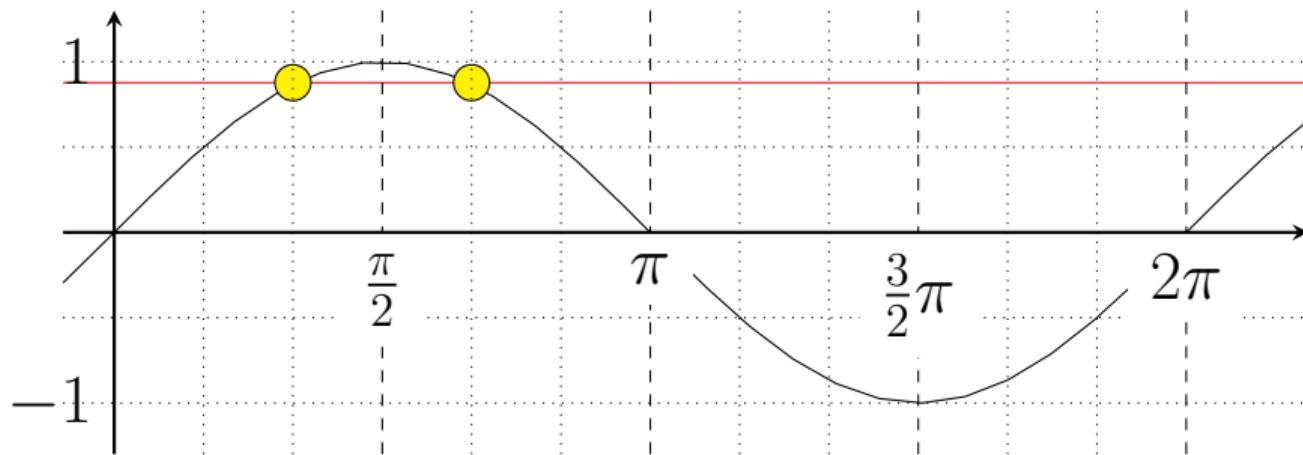
問 1

$$(1) \quad \sin \theta = \frac{\sqrt{3}}{2}$$



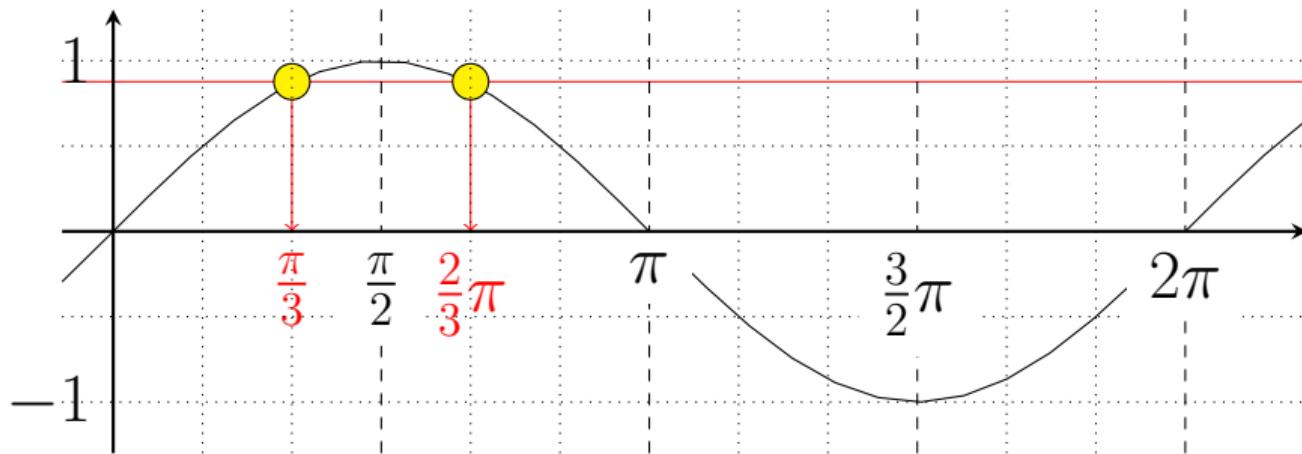
問 1

$$(1) \quad \sin \theta = \frac{\sqrt{3}}{2}$$



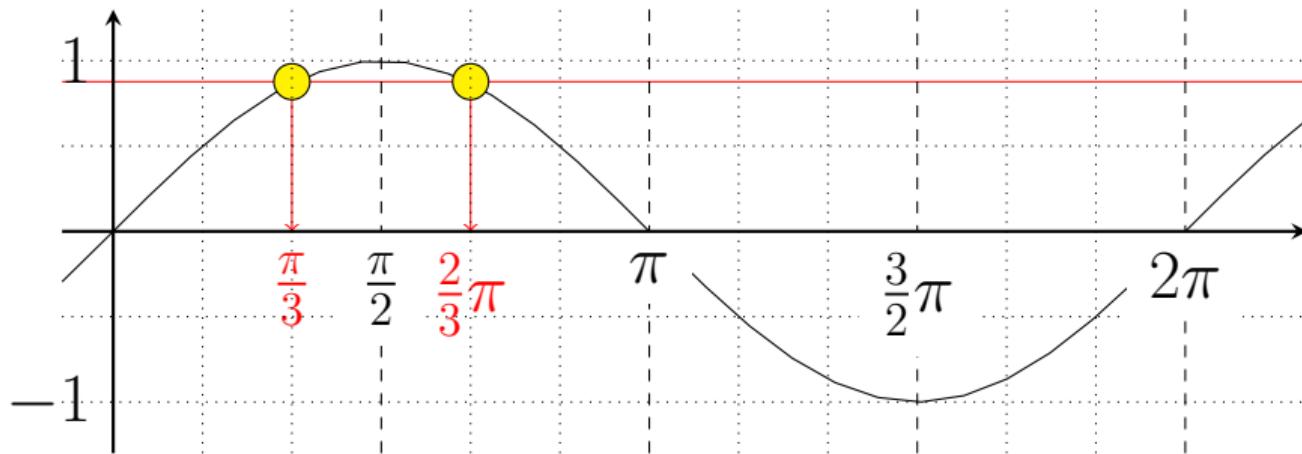
問 1

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問 1

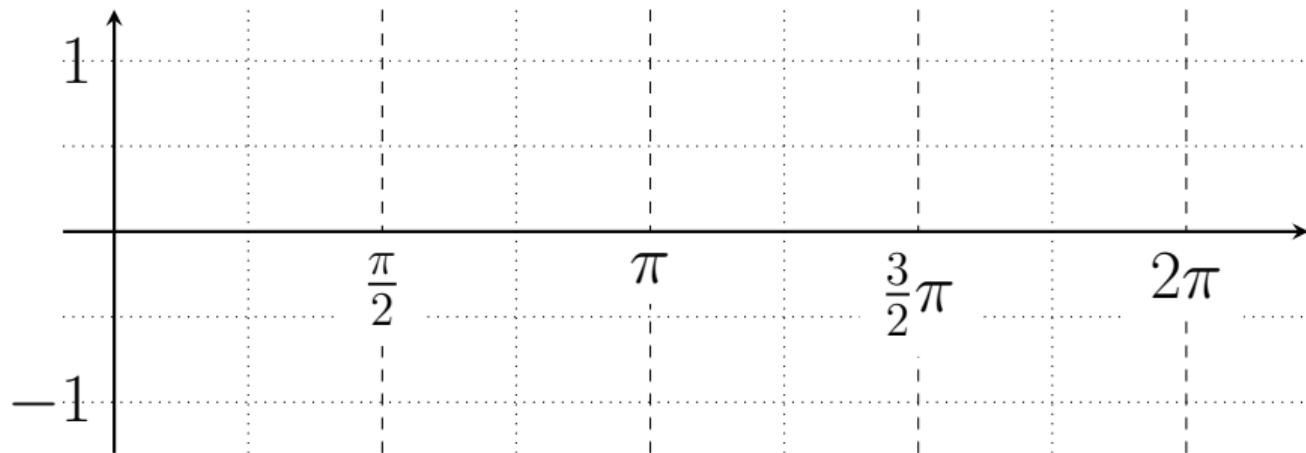
$$(1) \quad \sin \theta = \frac{\sqrt{3}}{2}$$



答 $\frac{\pi}{3} + 2n\pi, \quad \frac{2}{3}\pi + 2n\pi \quad (n \text{ は整数})$

問 1

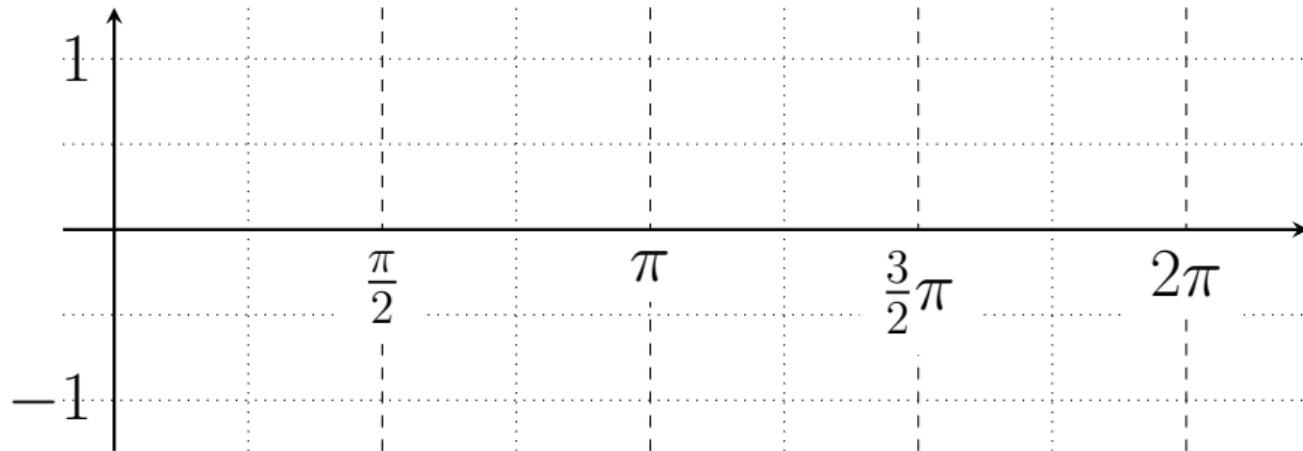
(2) $2 \cos \theta = \sqrt{2}$



問 1

$$(2) \quad 2 \cos \theta = \sqrt{2}$$

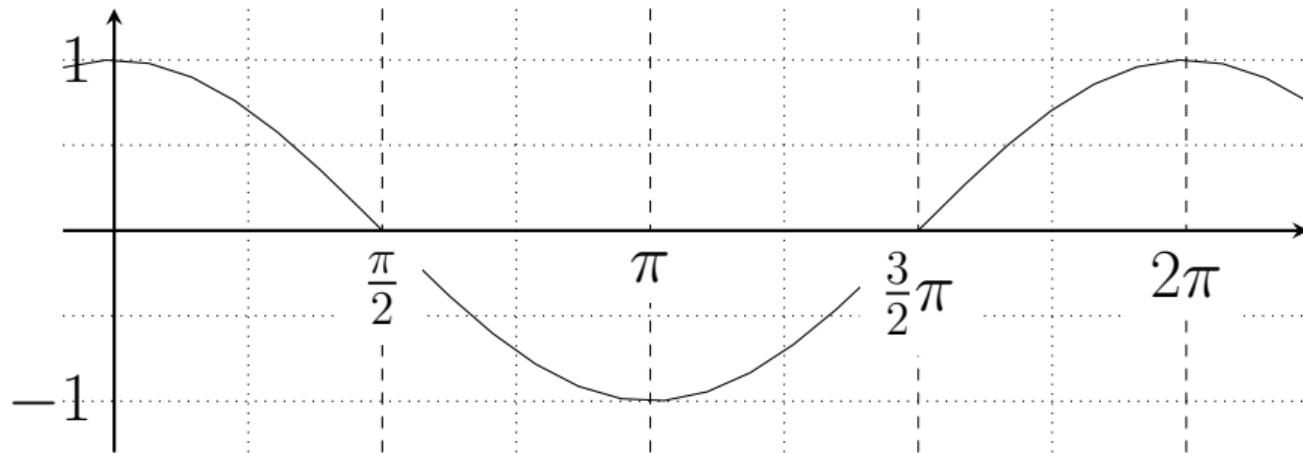
$$\cos \theta = \frac{\sqrt{2}}{2}$$



問 1

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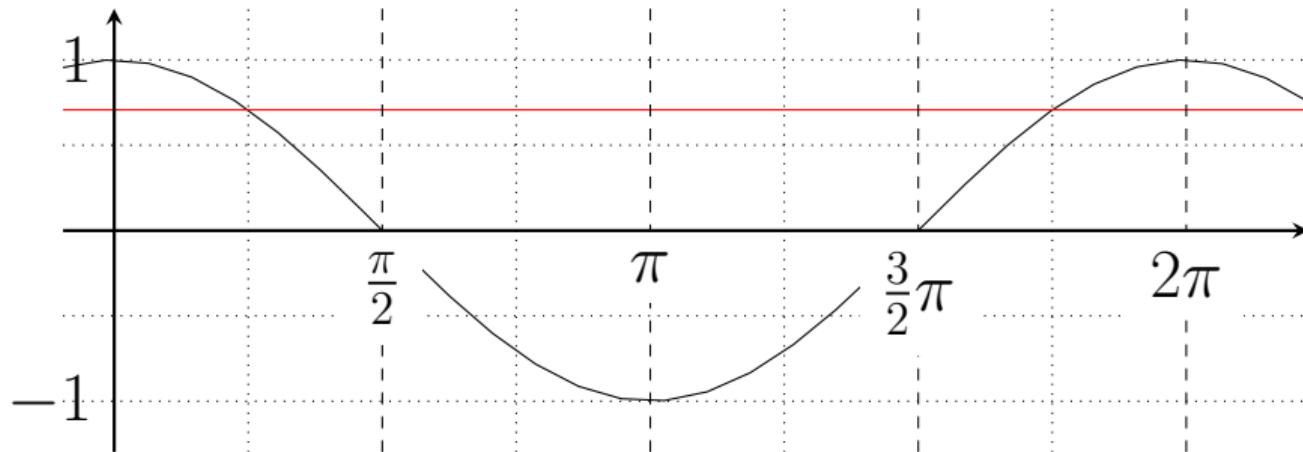
$$\cos \theta = \frac{\sqrt{2}}{2}$$



問 1

$$(2) \quad 2 \cos \theta = \sqrt{2}$$

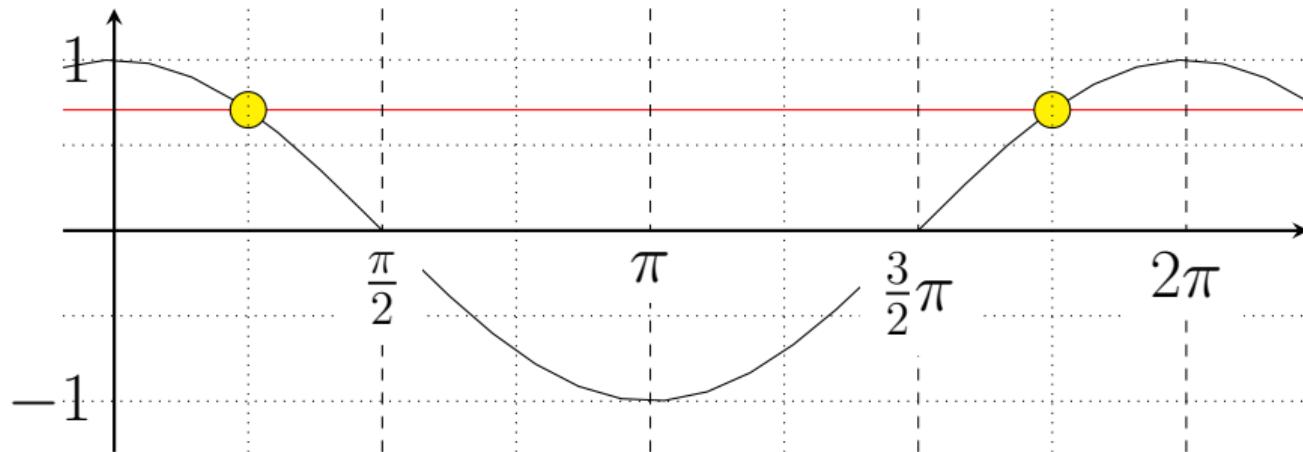
$$\cos \theta = \frac{\sqrt{2}}{2}$$



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$$(2) \quad 2 \cos \theta = \sqrt{2}$$

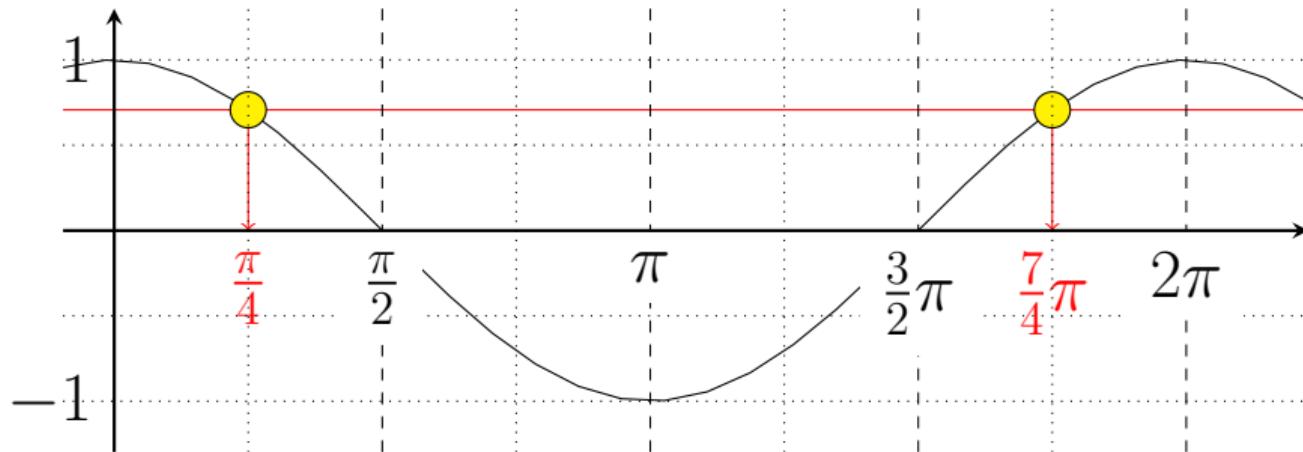
$$\cos \theta = \frac{\sqrt{2}}{2}$$



問 1

$$(2) \quad 2 \cos \theta = \sqrt{2}$$

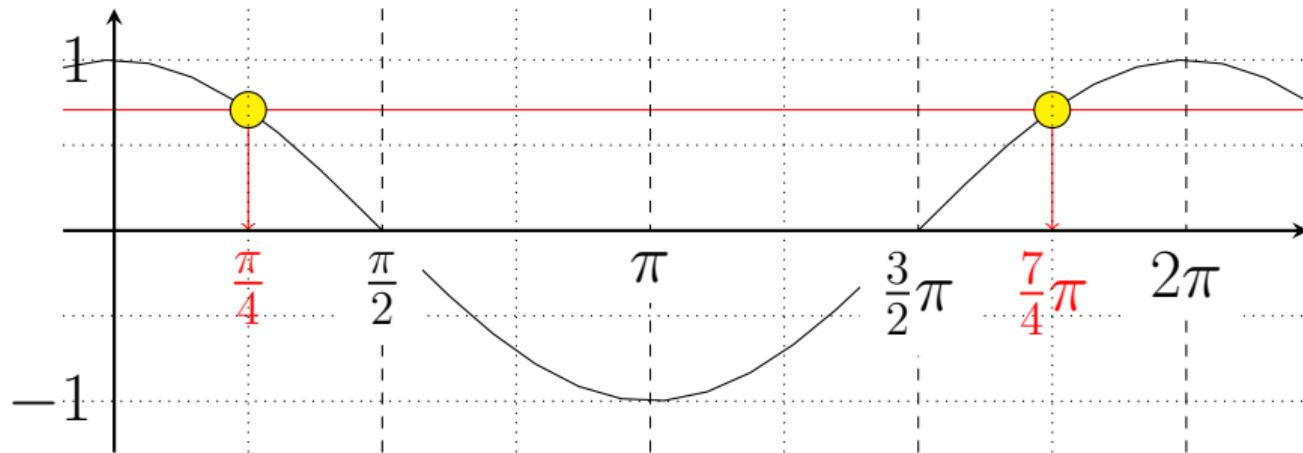
$$\cos \theta = \frac{\sqrt{2}}{2}$$



問 1

$$(2) \quad 2 \cos \theta = \sqrt{2}$$

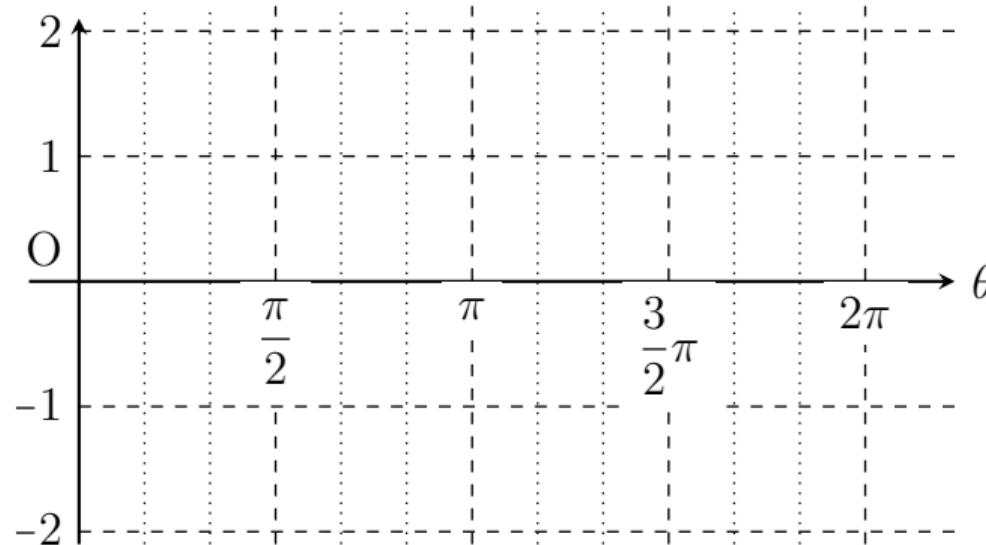
$$\cos \theta = \frac{\sqrt{2}}{2}$$



答 $\frac{\pi}{4} + 2n\pi, \quad \frac{7}{4}\pi + 2n\pi \quad (n \text{ は整数})$

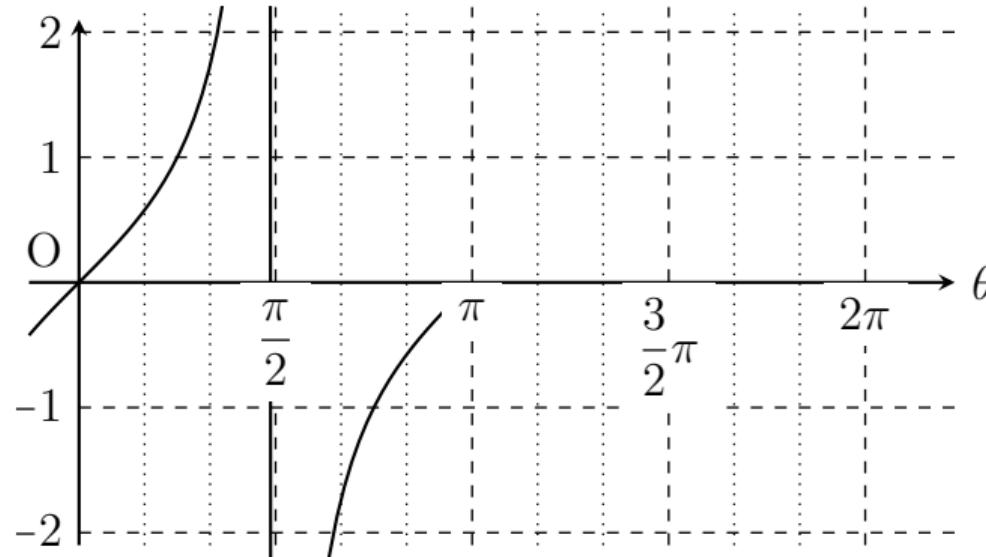
例 2

方程式 $\tan \theta = \sqrt{3}$ を満たす θ の値を求めよ。



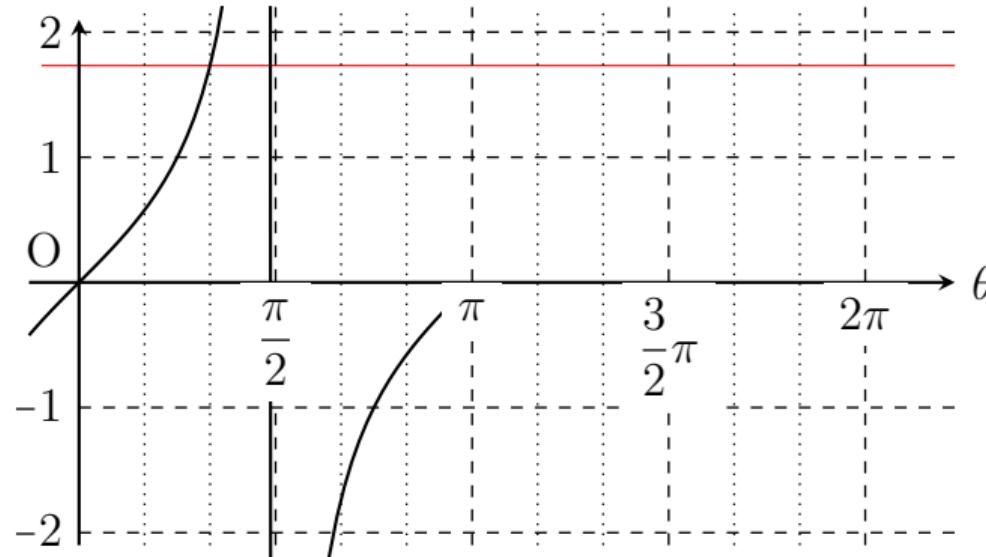
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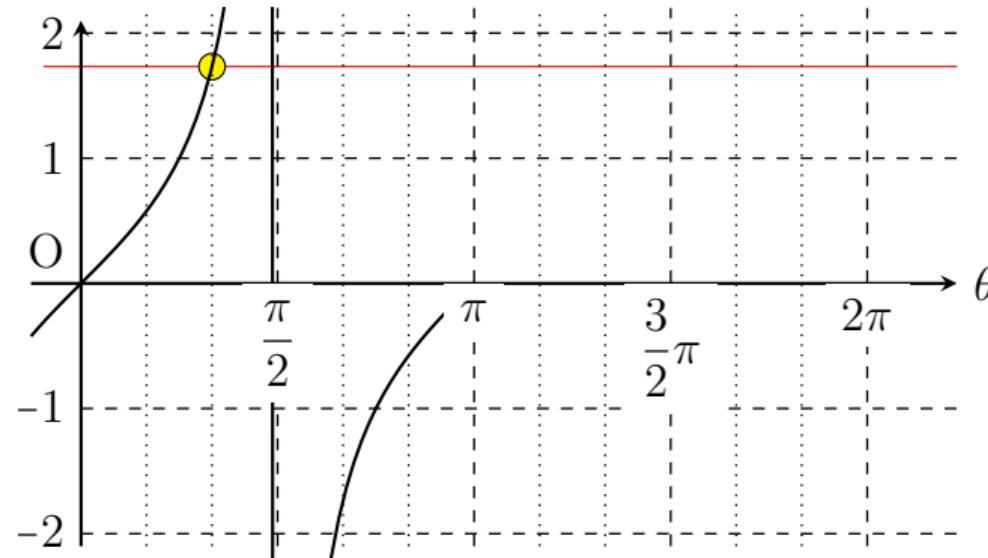
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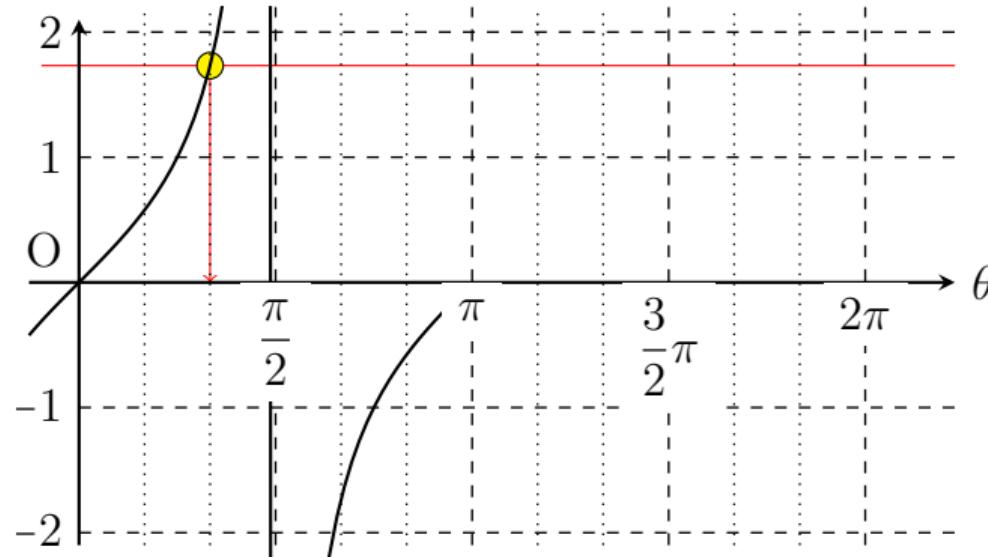
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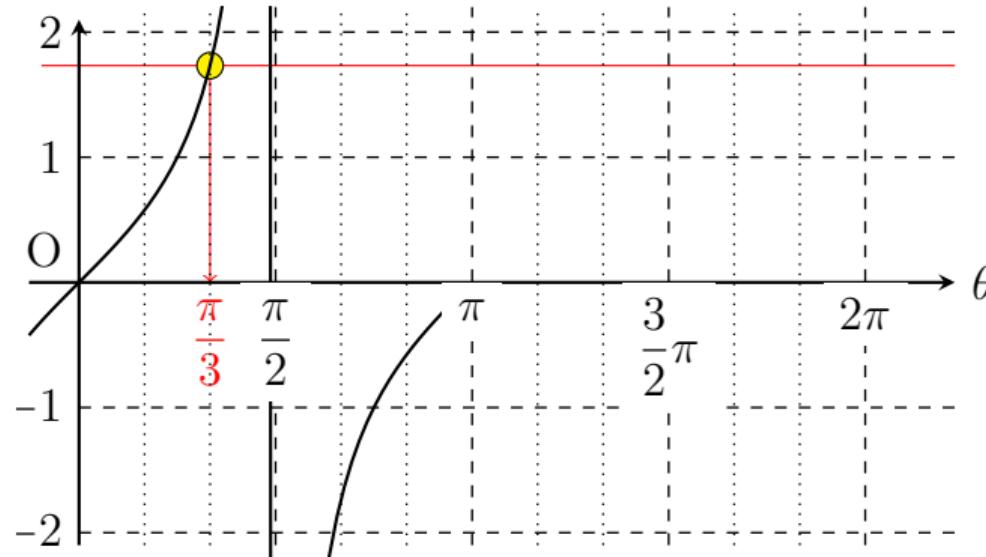
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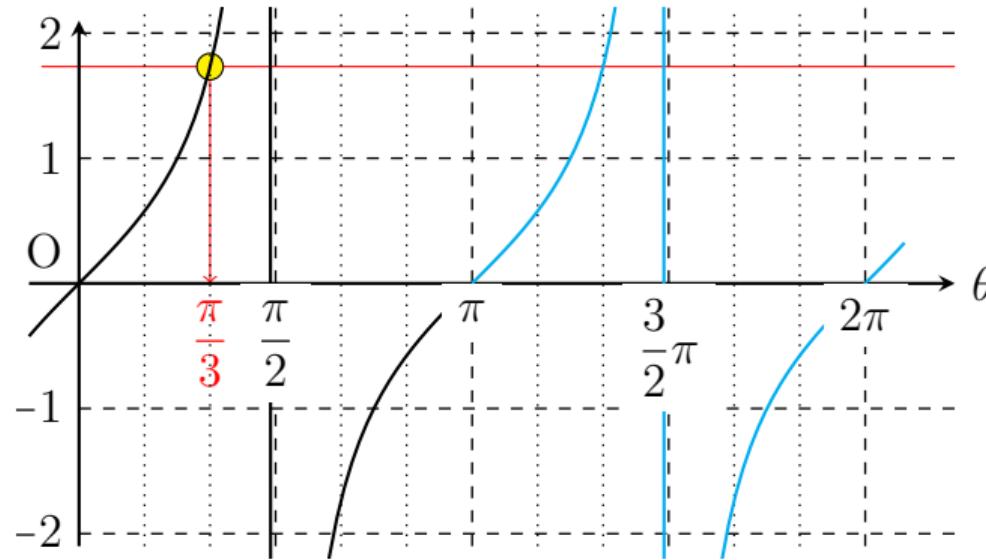
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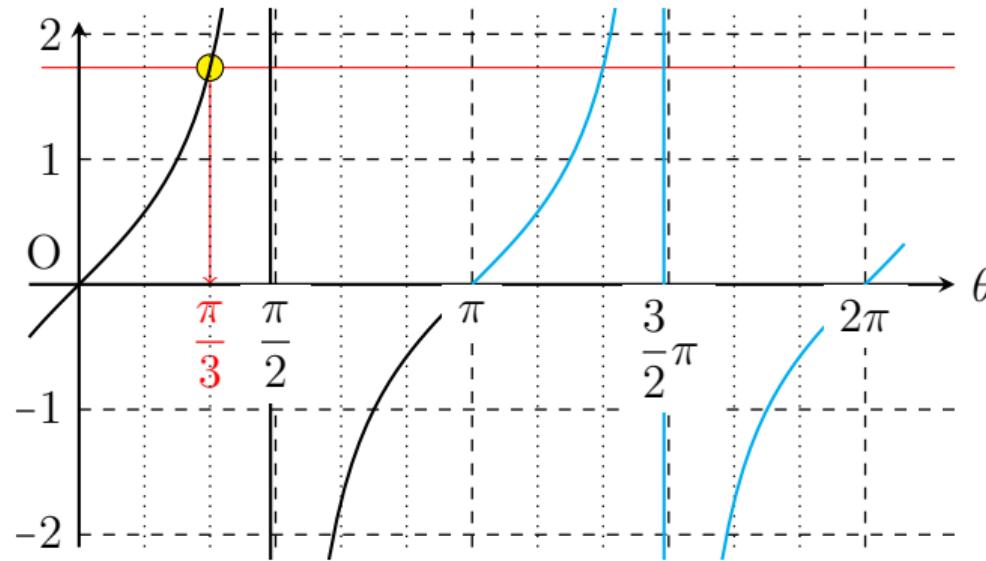
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答

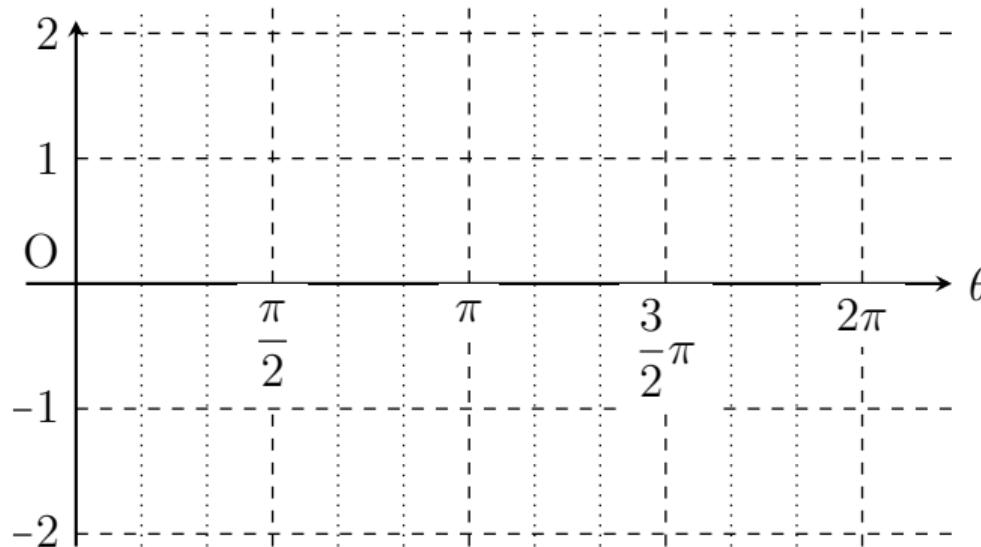
$$\frac{\pi}{3} + n\pi \quad (n \text{ は整数})$$

ビデオを止めて問題を解いてみよう

問 2 方程式 $\sqrt{3}\tan\theta + 1 = 0$ を満たす θ の値を求めよ。

問 2

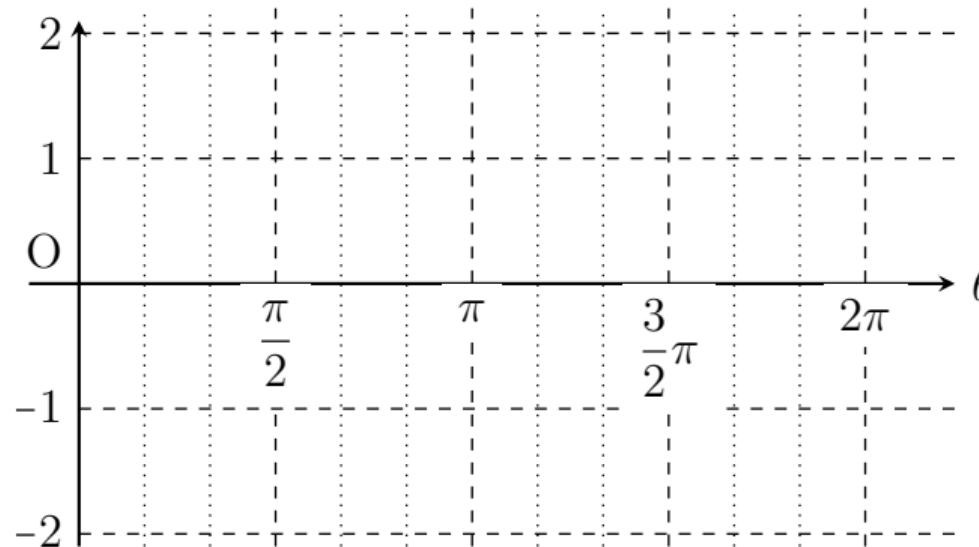
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問 2

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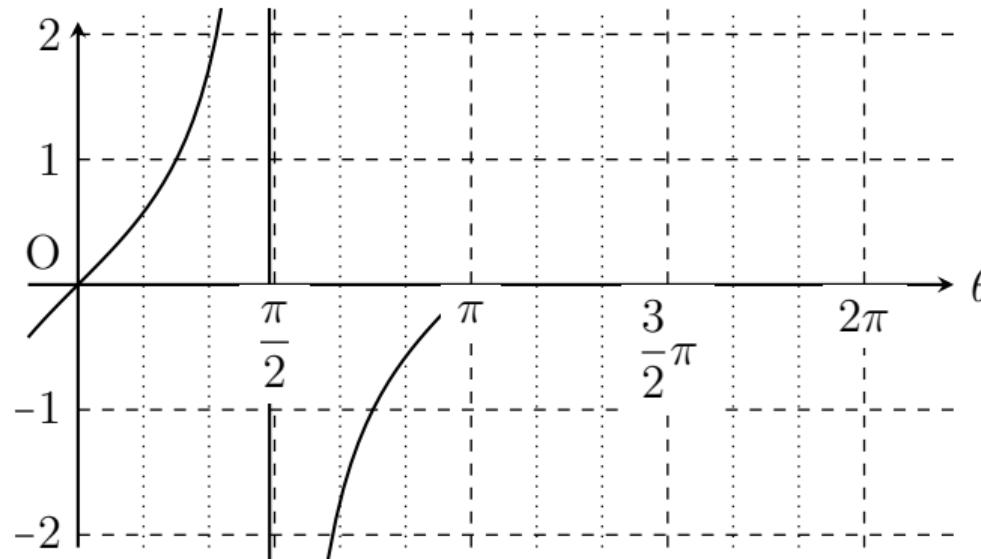
$$\tan \theta = -\frac{1}{\sqrt{3}}$$



問 2

$\sqrt{3} \tan \theta + 1 = 0$ を満たす θ の値を求めよ。

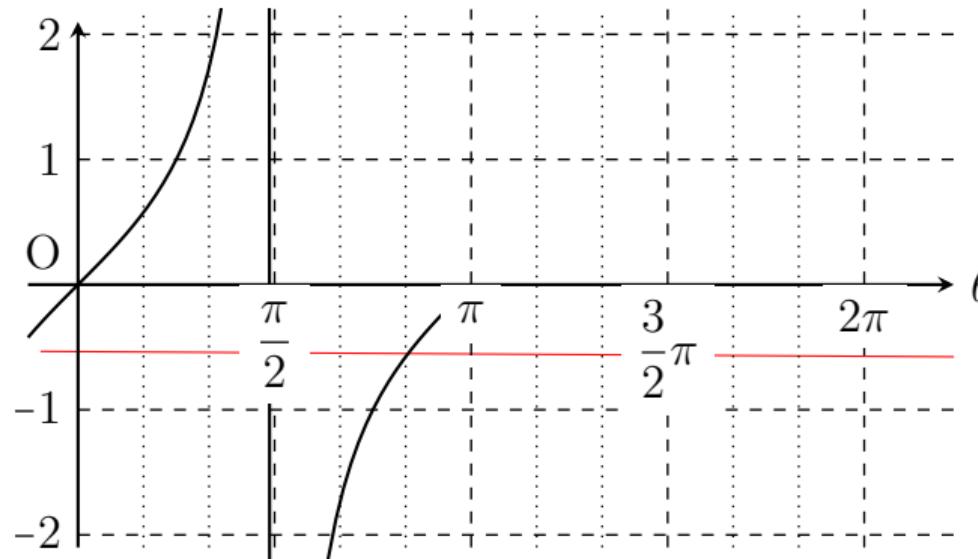
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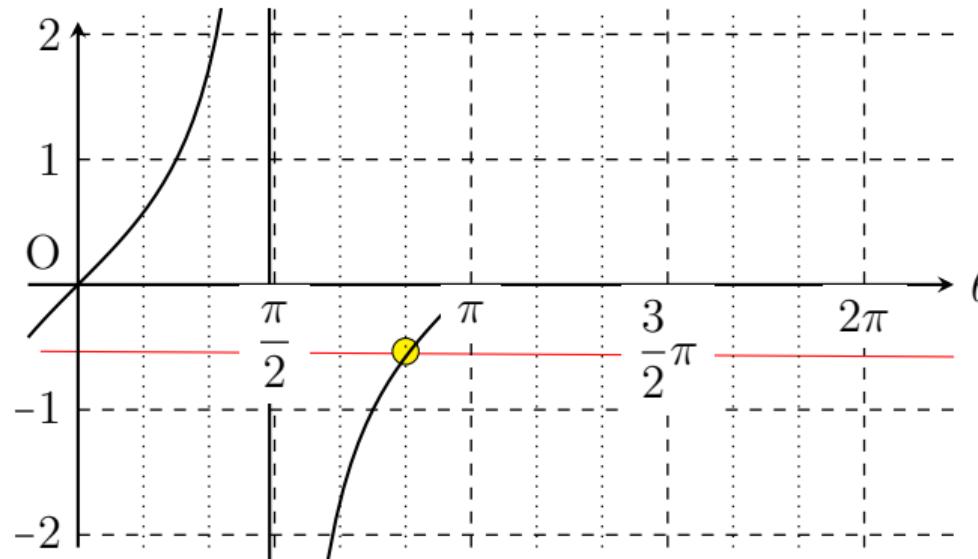
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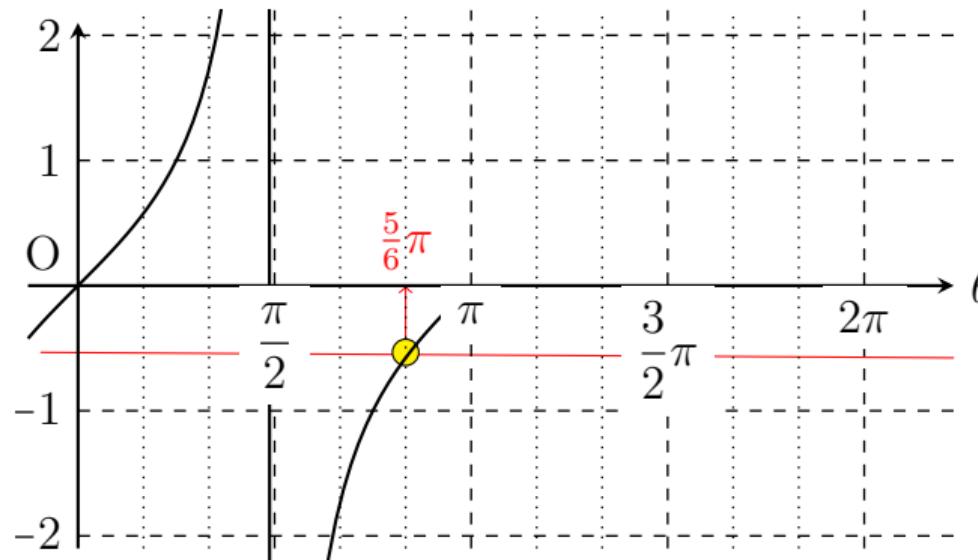
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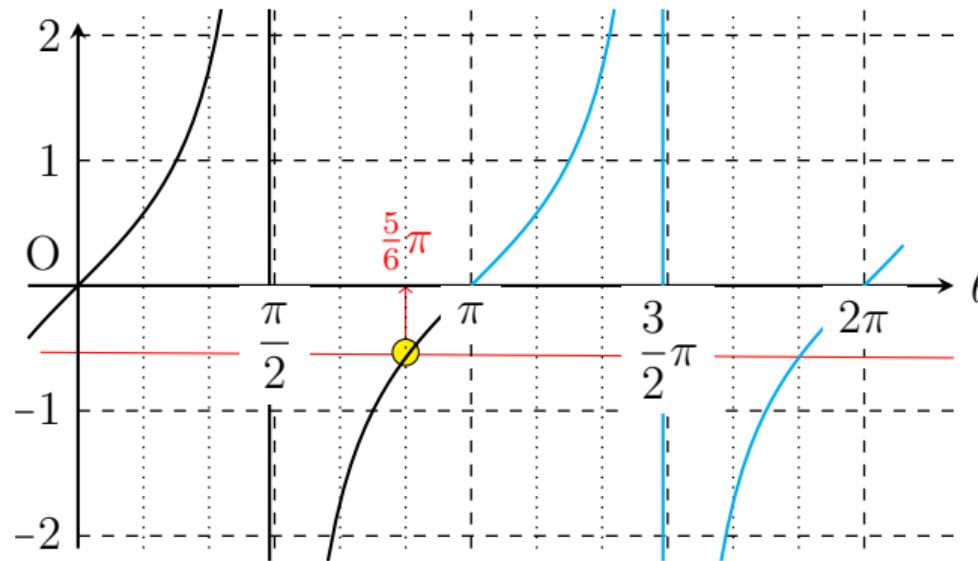
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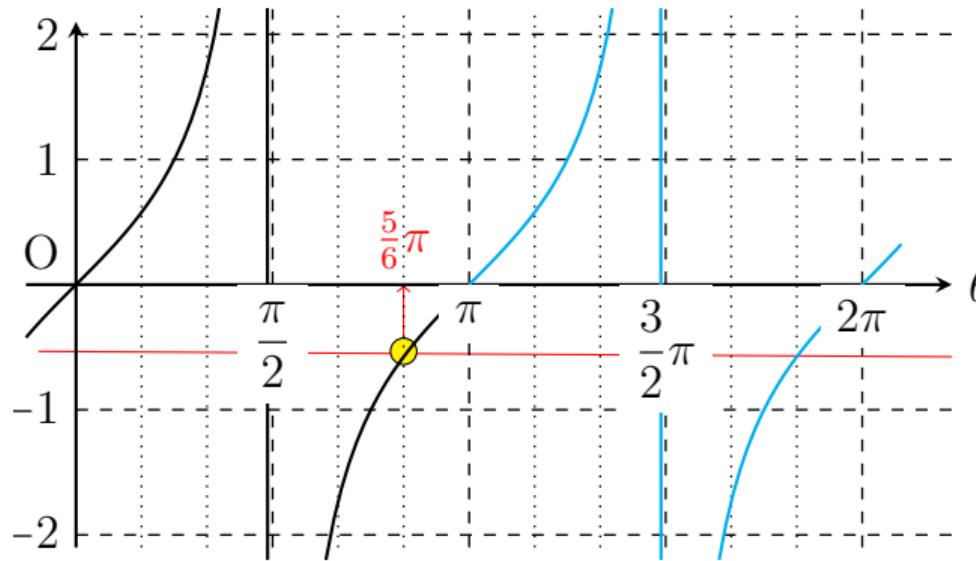
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問 2

$\sqrt{3} \tan \theta + 1 = 0$ を満たす θ の値を求めよ。

$$\tan \theta = -\frac{1}{\sqrt{3}}$$



答

$$\frac{5}{6}\pi + n\pi \quad (n \text{ は整数})$$

例 3 $0 \leq \theta < 2\pi$ で、 $\sin(\theta + \frac{\pi}{4}) = \frac{1}{2}$ を満たす θ を求めよ。

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$x = (\theta + \frac{\pi}{4})$ とすると、

例 3 $0 \leq \theta < 2\pi$ で、 $\sin(\theta + \frac{\pi}{4}) = \frac{1}{2}$ を満たす θ を求めよ。

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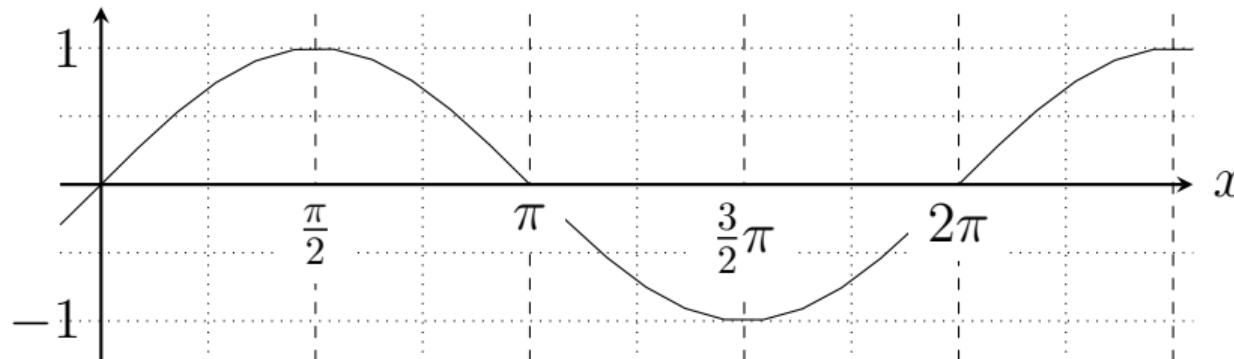
$$x = (\theta + \frac{\pi}{4}) \text{ とすると、 } \sin x = \frac{1}{2}$$
$$\frac{\pi}{4} \leq \theta + \frac{\pi}{4} < \frac{9}{4}\pi$$

例 3 $0 \leq \theta < 2\pi$ で、 $\sin(\theta + \frac{\pi}{4}) = \frac{1}{2}$ を満たす θ を求めよ。

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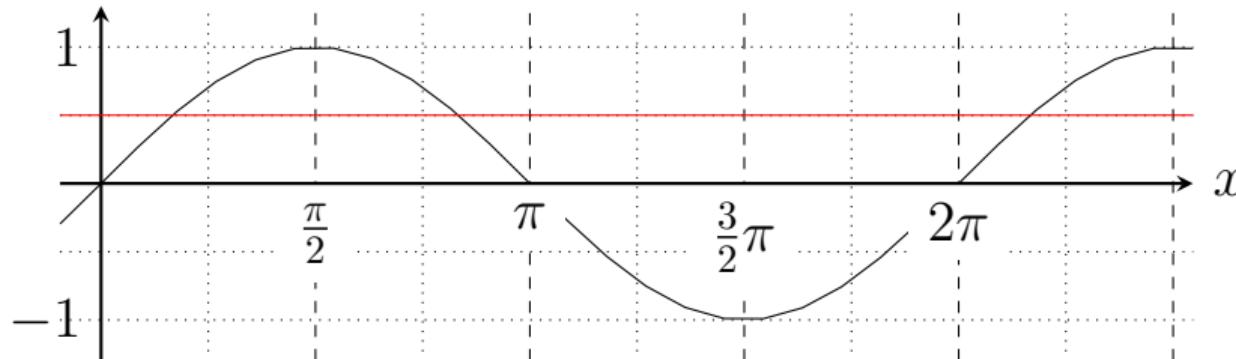
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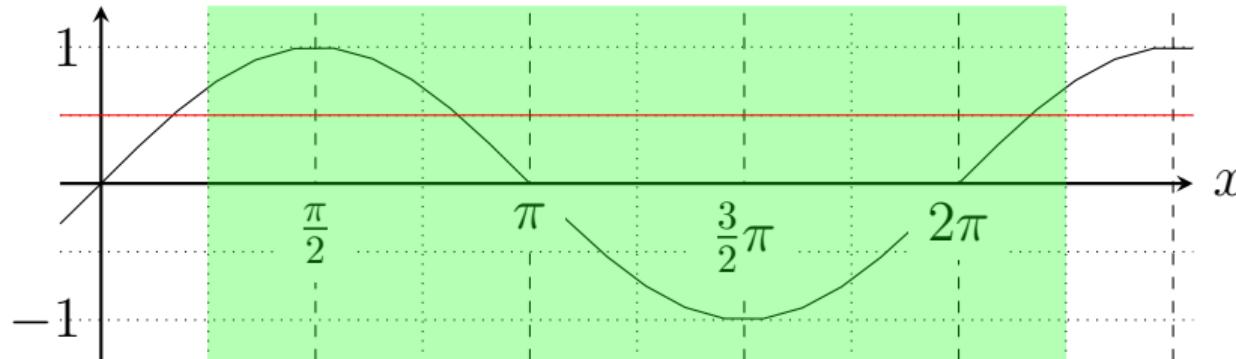
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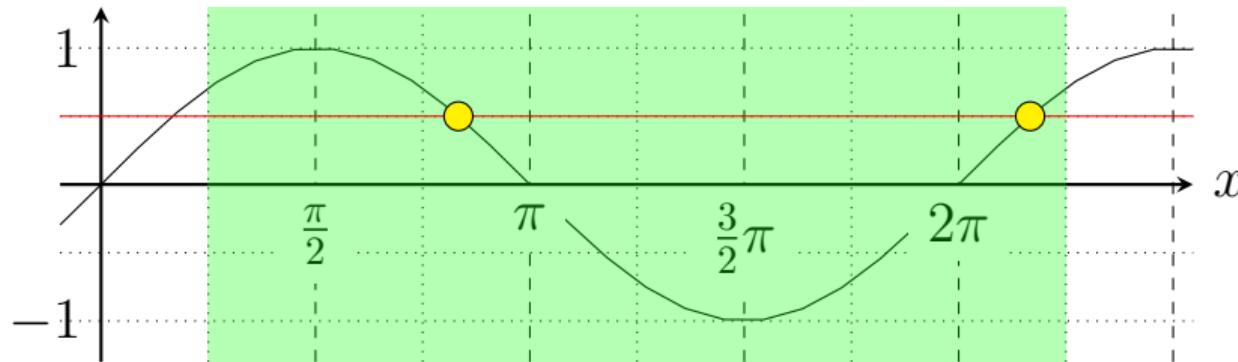
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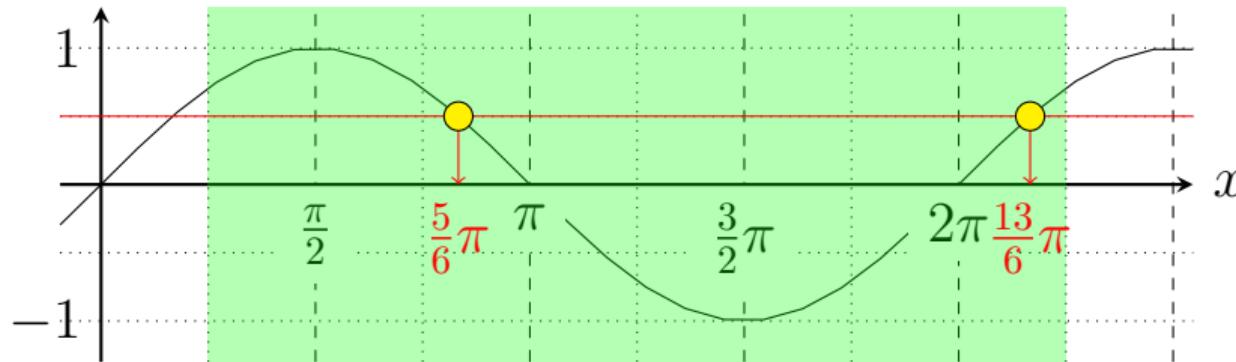
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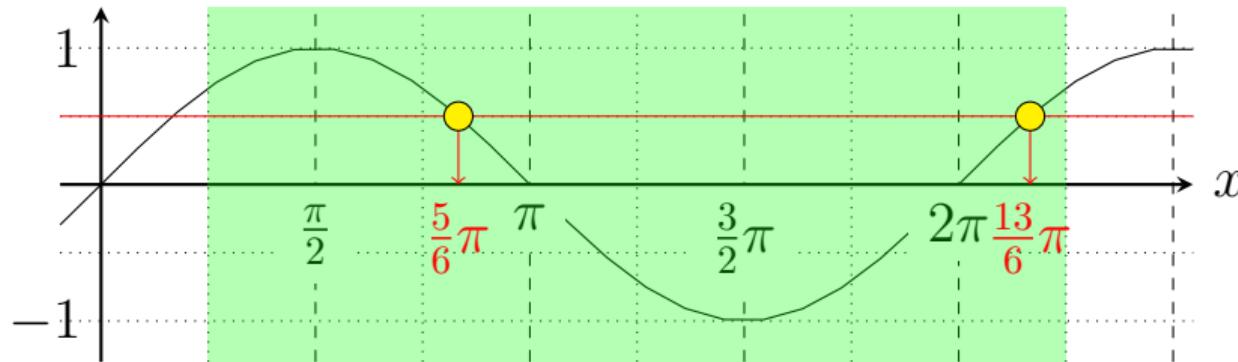
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例 3 $0 \leq \theta < 2\pi$ で、 $\sin(\theta + \frac{\pi}{4}) = \frac{1}{2}$ を満たす θ を求めよ。

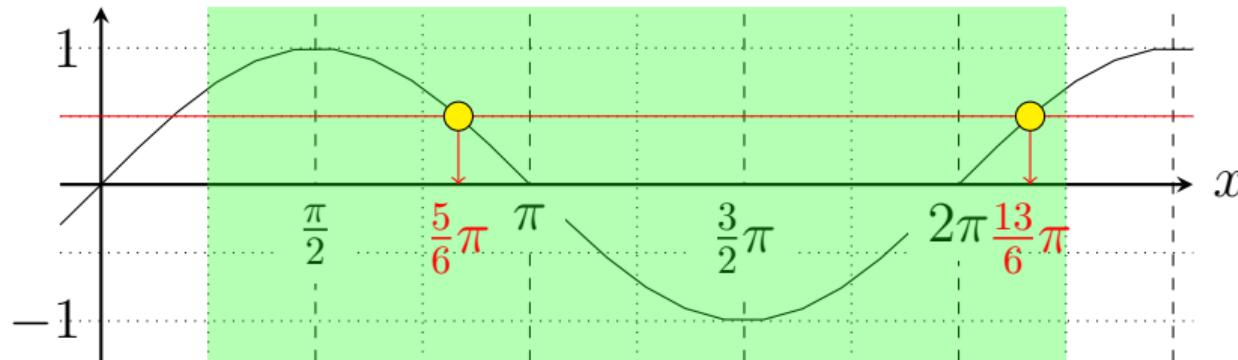
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$$x = \frac{5}{6}\pi, \quad \frac{13}{6}\pi$$

例 3 $0 \leq \theta < 2\pi$ で、 $\sin(\theta + \frac{\pi}{4}) = \frac{1}{2}$ を満たす θ を求めよ。

$$x = (\theta + \frac{\pi}{4}) \text{ とすると、 } \sin x = \frac{1}{2}$$
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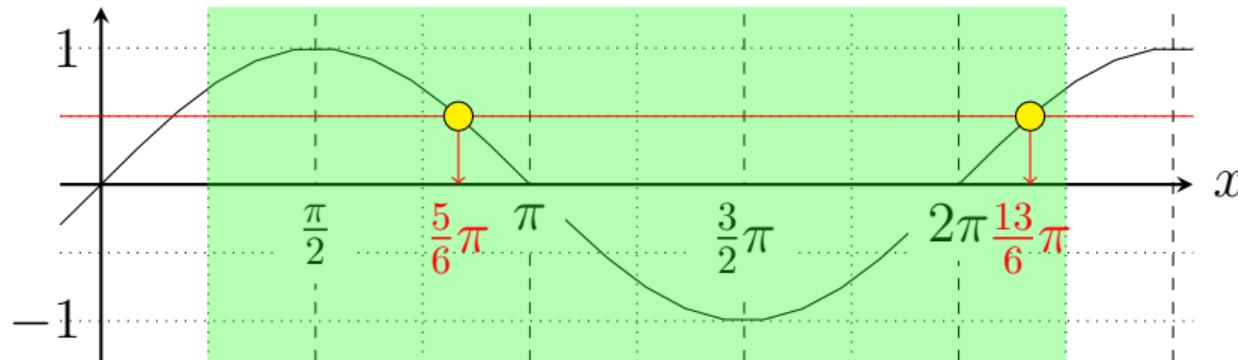


$$x = \frac{5}{6}\pi, \quad \frac{13}{6}\pi$$

$$\theta = x - \frac{\pi}{4}$$

例 3 $0 \leq \theta < 2\pi$ で、 $\sin(\theta + \frac{\pi}{4}) = \frac{1}{2}$ を満たす θ を求めよ。

$$x = (\theta + \frac{\pi}{4}) \text{ とすると、 } \sin x = \frac{1}{2}$$
$$\frac{\pi}{4} \leq \theta + \frac{\pi}{4} < \frac{9}{4}\pi \quad \rightarrow \quad \frac{\pi}{4} \leq x < \frac{9}{4}\pi$$



$$x = \frac{5}{6}\pi, \quad \frac{13}{6}\pi$$

$$\theta = x - \frac{\pi}{4}$$

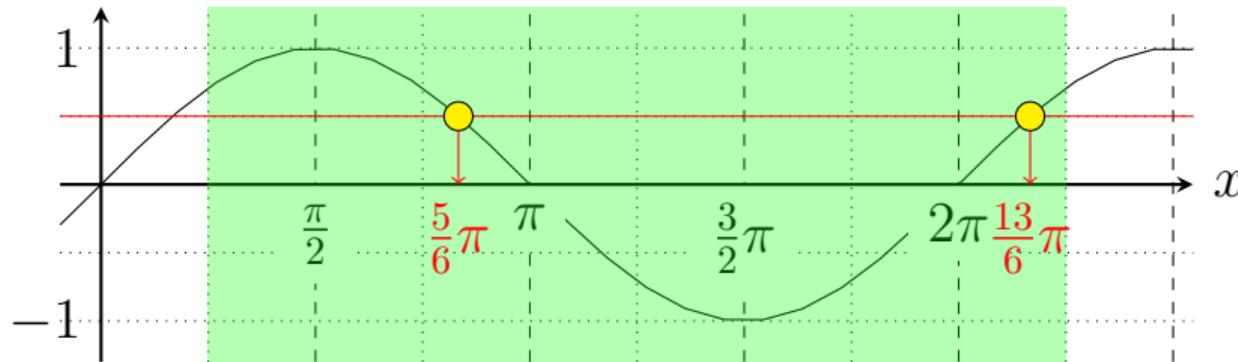
答

$$\frac{7}{12}\pi,$$



例 3 $0 \leq \theta < 2\pi$ で、 $\sin(\theta + \frac{\pi}{4}) = \frac{1}{2}$ を満たす θ を求めよ。

$$x = (\theta + \frac{\pi}{4}) \text{ とすると、 } \sin x = \frac{1}{2}$$
$$\frac{\pi}{4} \leq \theta + \frac{\pi}{4} < \frac{9}{4}\pi \quad \rightarrow \quad \frac{\pi}{4} \leq x < \frac{9}{4}\pi$$



$$x = \frac{5}{6}\pi, \quad \frac{13}{6}\pi$$

$$\theta = x - \frac{\pi}{4}$$

答 $\frac{7}{12}\pi, \quad \frac{23}{12}\pi$

ビデオを止めて問題を解いてみよう

問 3 $0 \leq \theta < 2\pi$ のとき、次の方程式を満たす θ を求めよ。

$$(1) \quad \cos(\theta + \frac{\pi}{3}) = \frac{\sqrt{3}}{2}$$

$$(2) \quad \sin(\theta - \frac{\pi}{4}) = -\frac{1}{2}$$

問 3

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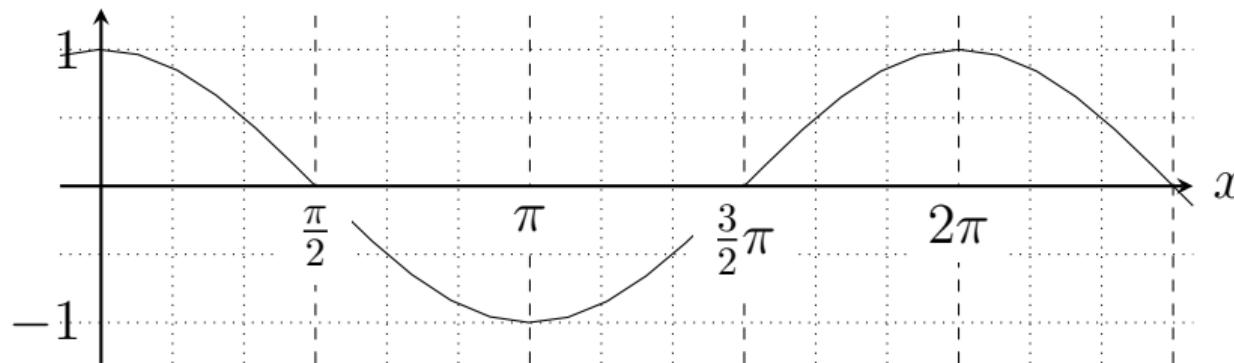
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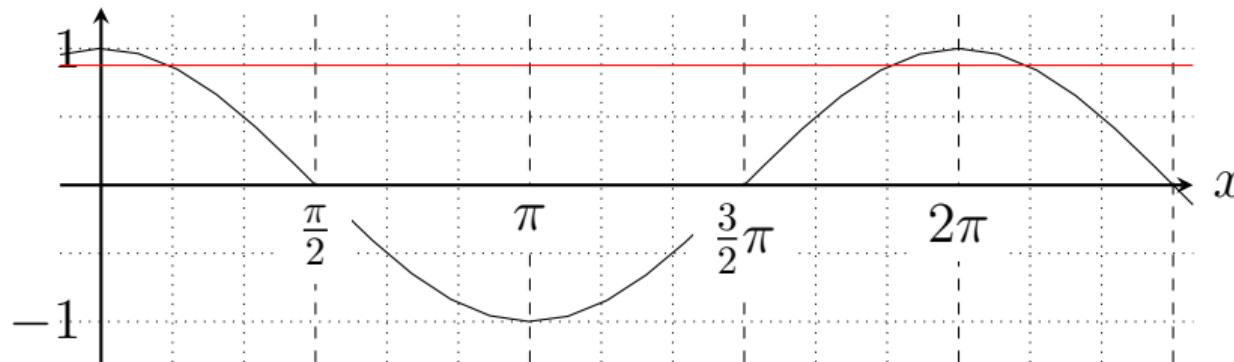
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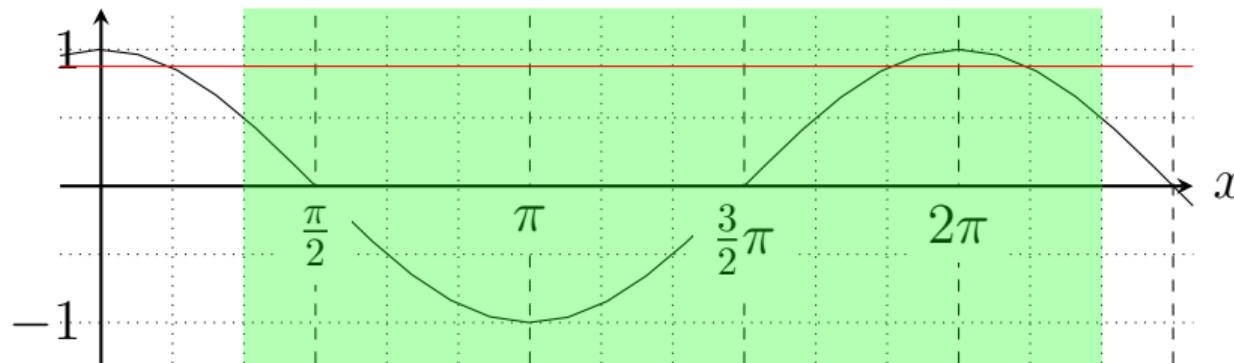
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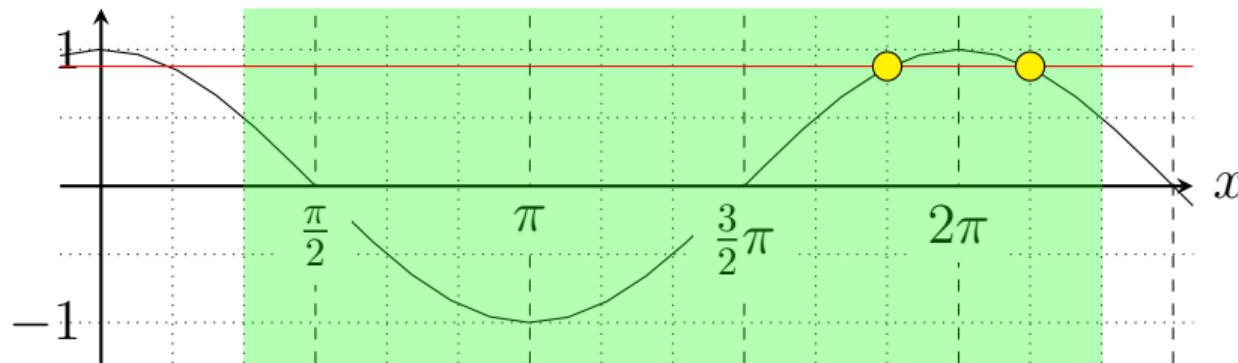
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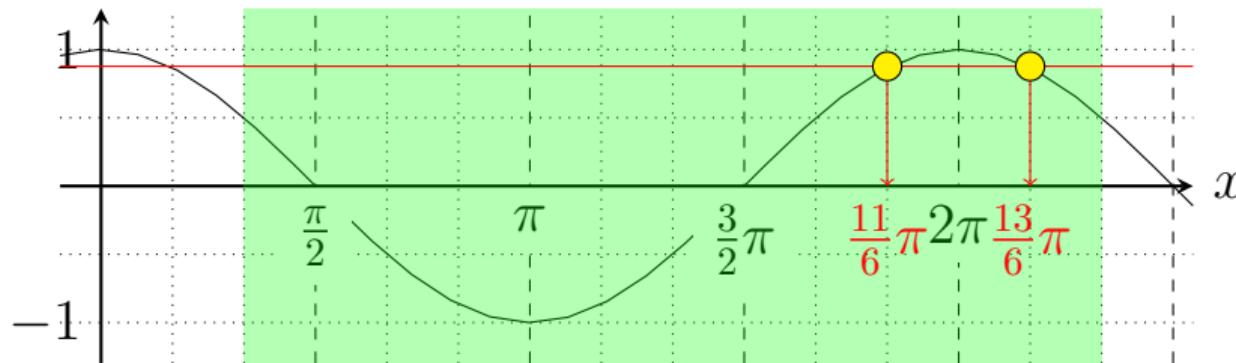
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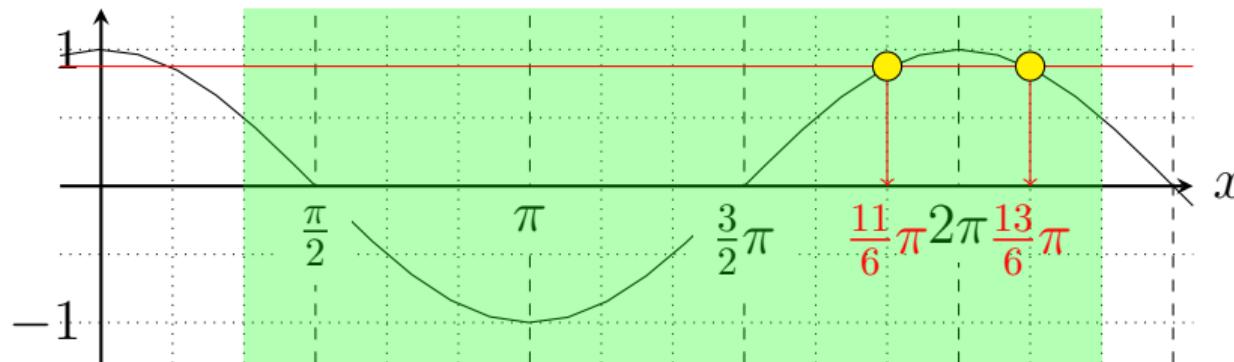


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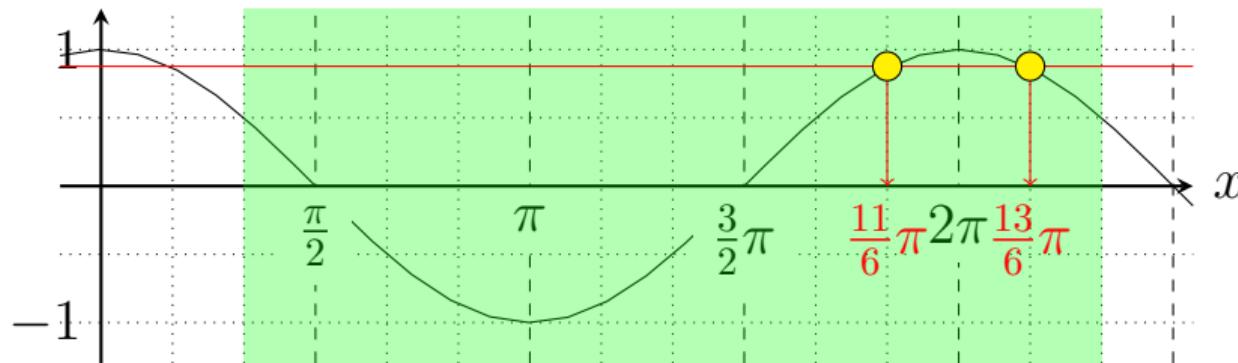


$$x = \frac{11}{6}\pi, \quad \frac{13}{6}\pi$$

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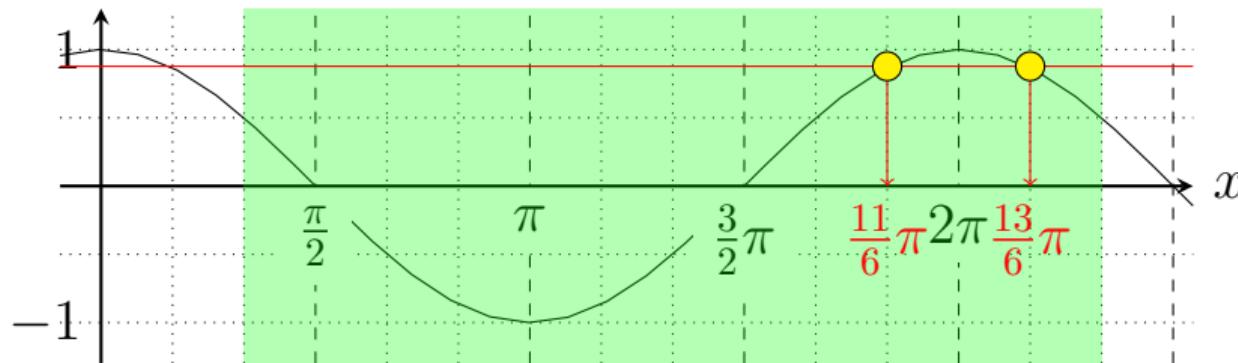
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$$x = \frac{11}{6}\pi, \quad \frac{13}{6}\pi$$

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答 $\frac{3}{2}\pi, \quad \frac{11}{6}\pi$

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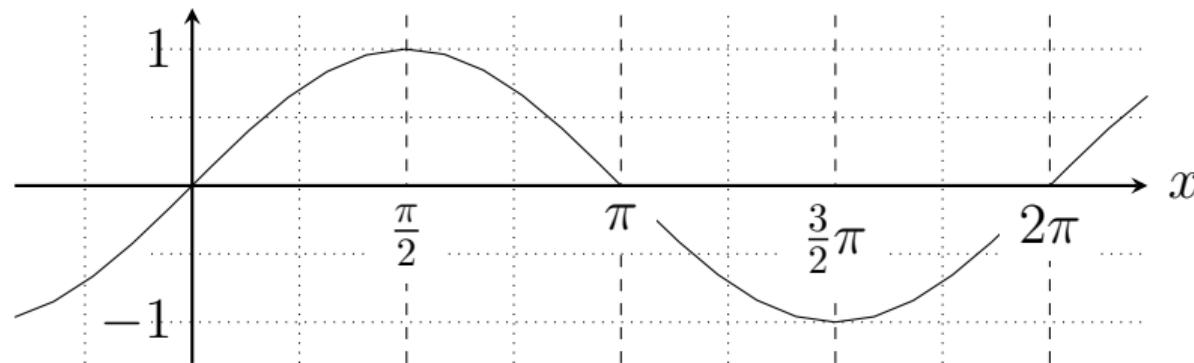
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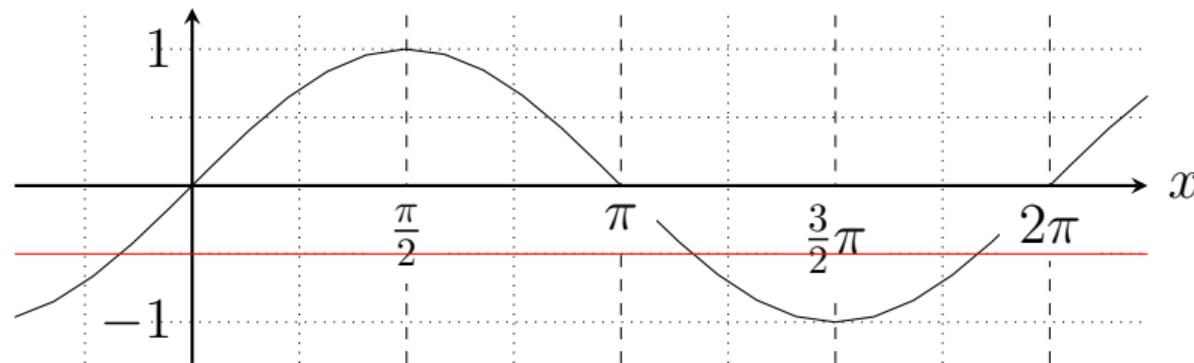
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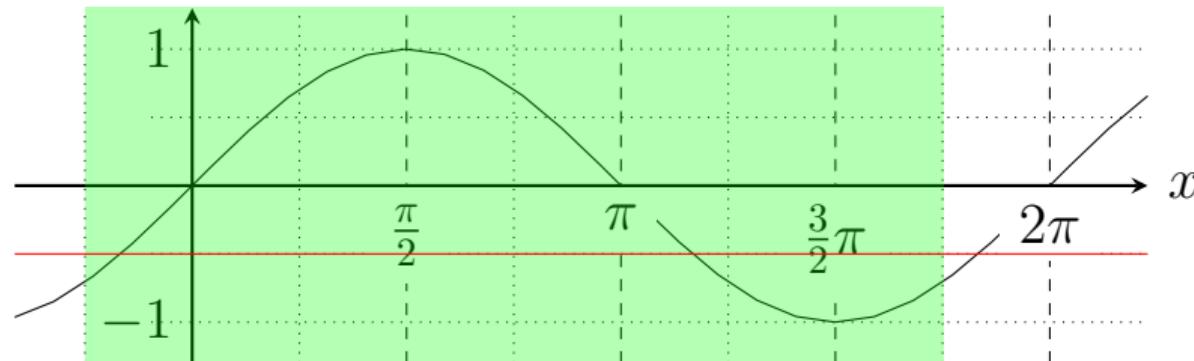
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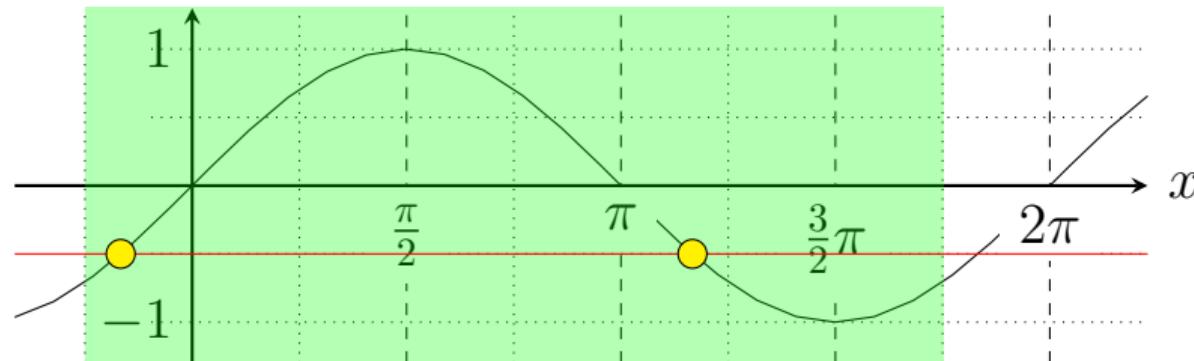
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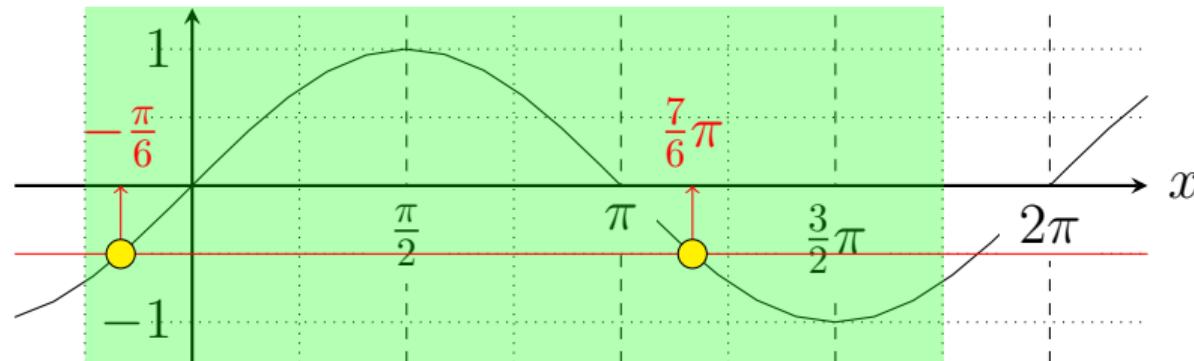
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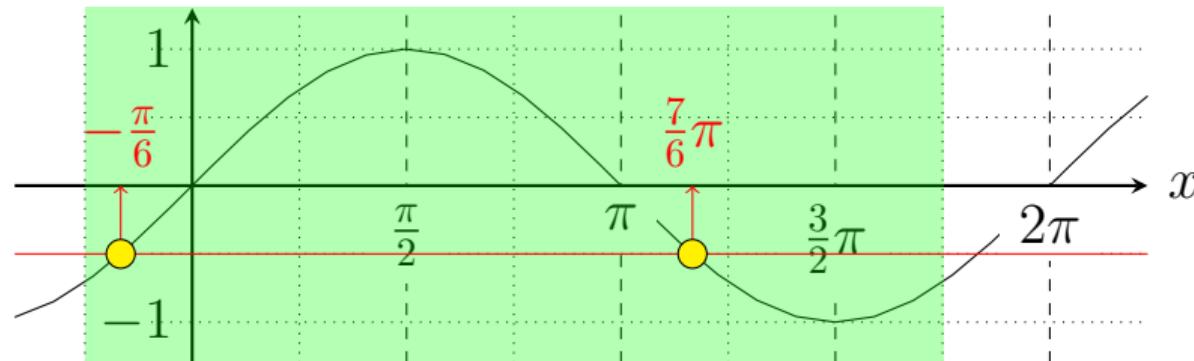
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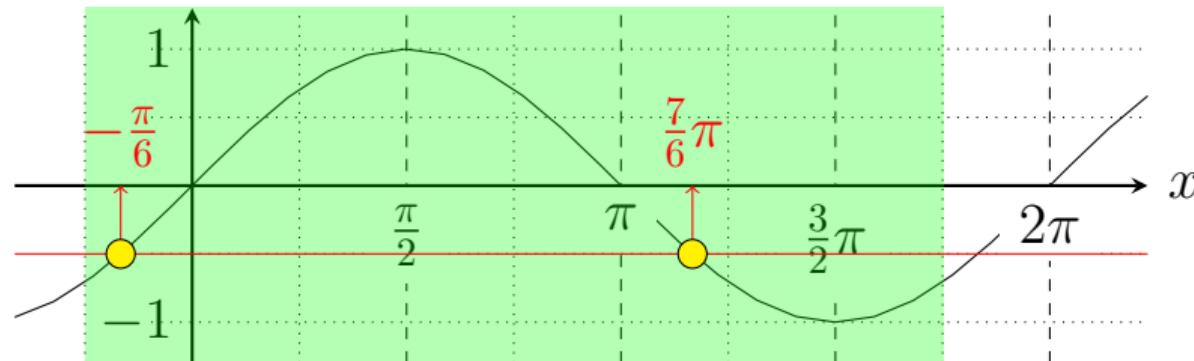


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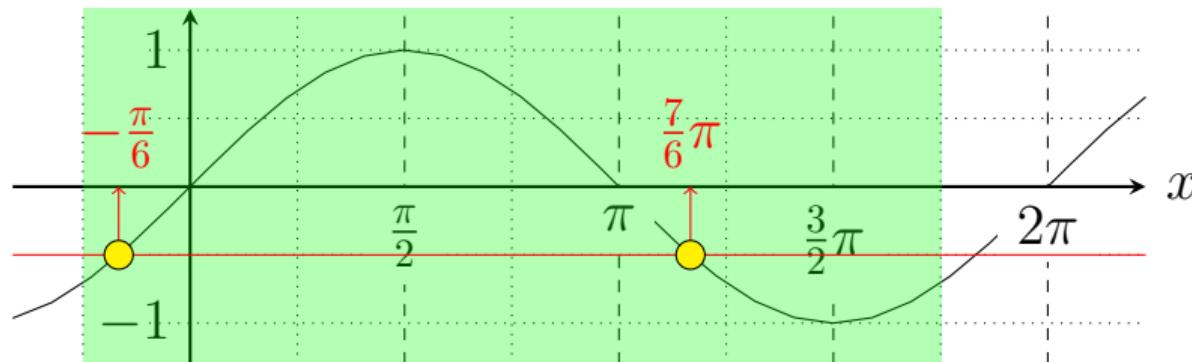


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$$x = -\frac{\pi}{6}, \quad \frac{7}{6}\pi$$
$$\theta = x + \frac{\pi}{4}$$

答 $\frac{\pi}{12}, \quad \frac{17}{12}\pi$

今回の学習目標

三角方程式を解く

- グラフを活用して、値から角を逆算する。