

3. 三角関数

$$180^\circ = \pi \text{ (rad)}$$

問 次の問いに答えよ。

$$(1) 2 \text{ (rad)} = x^\circ \Rightarrow x =$$

$$(2) y \text{ (rad)} = 12^\circ \Rightarrow y =$$

$$y = a \sin bx + c \Rightarrow (\text{振幅}) = a, (\text{周期}) = \frac{2\pi}{b}, \quad y = \tan bx \Rightarrow (\text{周期}) = \frac{\pi}{b}$$

グラフ

問 振幅、周期等を調べて次のグラフを書け。

$$(1) y = \sin \frac{x}{2} + 1$$

$$(2) y = \sin^2 x$$

$$(3) y = \tan 2x$$

三角方程式・不等式

問 次の方程式・不等式を解け。

$$(1) \sin x = -\frac{1}{2} \quad (0 \leq x < 2\pi)$$

$$(2) \cos x \leq -\frac{1}{2} \quad (0 \leq x < 2\pi)$$

$$(3) \tan \left(x - \frac{\pi}{4} \right) = \sqrt{3} \quad (0 \leq x < \pi)$$

基本公式と加法定理

$$\sin^2 x = 1 - \cos^2 x \quad (\cos^2 x = 1 - \sin^2 x) \quad 1 + \tan^2 x = \frac{1}{\cos^2 x} \quad \left(\cos^2 x + \sin^2 x = 1, \tan x = \frac{\sin x}{\cos x} \right)$$

$$\sin(\alpha \pm \beta) = \sin \alpha \cos \beta \pm \cos \alpha \sin \beta \quad \cos^2 x = \frac{1}{1 + \tan^2 x}$$

$$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \mp \sin \alpha \sin \beta \quad \tan(\alpha \pm \beta) = \frac{\tan \alpha \pm \tan \beta}{1 \mp \tan \alpha \tan \beta}$$

$$\sin 2x = 2 \sin x \cos x \quad \cos 2x = \cos^2 x - \sin^2 x \quad \tan 2x = \frac{2 \tan x}{1 - \tan^2 x}$$

$$\sin^2 x = \frac{1 - \cos 2x}{2} \quad \cos^2 x = \frac{1 + \cos 2x}{2} \quad a \sin x + b \cos x = \sqrt{a^2 + b^2} \sin(x + \theta) \quad \left(\tan \theta = \frac{b}{a} \right)$$

$$\sin A + \sin B = 2 \sin \frac{A+B}{2} \cos \frac{A-B}{2} \quad \sin \alpha \cos \beta = \frac{1}{2} \{ \sin(\alpha + \beta) + \sin(\alpha - \beta) \}$$

$$\sin A - \sin B = 2 \cos \frac{A+B}{2} \sin \frac{A-B}{2} \quad \cos \alpha \sin \beta = \frac{1}{2} \{ \sin(\alpha + \beta) - \sin(\alpha - \beta) \}$$

$$\cos A + \cos B = 2 \cos \frac{A+B}{2} \cos \frac{A-B}{2} \quad \cos \alpha \cos \beta = \frac{1}{2} \{ \cos(\alpha + \beta) + \cos(\alpha - \beta) \}$$

$$\cos A - \cos B = -2 \sin \frac{A+B}{2} \sin \frac{A-B}{2} \quad \sin \alpha \sin \beta = \frac{-1}{2} \{ \cos(\alpha + \beta) - \cos(\alpha - \beta) \}$$

問 α は第2象限の角で $\cos \alpha = -\frac{1}{3}$ 、 β は第3象限の角で $\tan \beta = 2\sqrt{2}$ のとき、次を求めよ。

(1) 残りの三角関数の値

$$\cos \alpha = -\frac{1}{3}$$

$$\cos \beta =$$

$$\sin \alpha =$$

$$\sin \beta =$$

$$\tan \alpha =$$

$$\tan \beta = 2\sqrt{2}$$

(2) $\sin(\alpha + \beta) =$

$$\cos(\alpha + \beta) =$$

$$\tan(\alpha + \beta) =$$

$$\sin 2\alpha =$$

$$\cos 2\alpha =$$

$$\tan 2\beta =$$

$$\sin^2 \frac{\alpha}{2} =$$

$$\cos^2 \frac{\beta}{2} =$$

(3) $\sqrt{3} \sin x - \cos x = r \sin(x - \theta) \Rightarrow r =$

$$\theta =$$