公式（三角関数）

角の単位変換

度→ラジアン： $\alpha^\circ = \dfrac{\alpha\pi}{180}$　　ラジアン→度： $\theta = \left(\dfrac{180\,\theta}{\pi}\right)^\circ$

一般角の公式

$\sin(\alpha + 2n\pi) = \sin\alpha$　　$\cos(\alpha + 2n\pi) = \cos\alpha$　　$\tan(\alpha + 2n\pi) = \tan\alpha$　（n は整数）

反角公式

$\sin(-\alpha) = -\sin\alpha$　　$\cos(-\alpha) = +\cos\alpha$　　$\tan(-\alpha) = -\tan\alpha$

余角公式

$\sin\left(\dfrac{\pi}{2} - \alpha\right) = \cos\alpha$　　$\cos\left(\dfrac{\pi}{2} - \alpha\right) = \sin\alpha$　　$\tan\left(\dfrac{\pi}{2} - \alpha\right) = \dfrac{1}{\tan\alpha}$

補角公式

$\sin(\pi - \alpha) = +\sin\alpha$　　$\cos(\pi - \alpha) = -\cos\alpha$　　$\tan(\pi - \alpha) = -\tan\alpha$

相互関係

$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

$\cos^2\theta + \sin^2\theta = 1$　　$1 + \tan^2\theta = \dfrac{1}{\cos^2\theta}$　　$\dfrac{1}{\tan^2\theta} + 1 = \dfrac{1}{\sin^2\theta}$

加法定理

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

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

$\tan(\alpha + \beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\ \tan\beta}$　　$\tan(\alpha - \beta) = \dfrac{\tan\alpha - \tan\beta}{1 + \tan\alpha\ \tan\beta}$

倍角公式

$$\sin 2\theta = 2\sin\theta\ \cos\theta$$

$\cos 2\theta = \cos^2\theta - \sin^2\theta$　　$\cos 2\theta = 2\cos^2\theta - 1$　　$\cos 2\theta = 1 - 2\sin^2\theta$

$\tan 2\theta = \dfrac{2\tan\theta}{1 - \tan^2\theta}$　　$\cos 2\theta = \dfrac{1 - \tan^2\theta}{1 + \tan^2\theta}$　　$\sin 2\theta = \dfrac{2\tan\theta}{1 + \tan^2\theta}$

半角公式

$$\sin^2\frac{\theta}{2} = \frac{1-\cos\theta}{2} \qquad \cos^2\frac{\theta}{2} = \frac{1+\cos\theta}{2}$$

三倍角公式

$$\sin 3\theta = 3\sin\theta - 4\sin^3\theta \qquad \sin^3\theta = \frac{3\sin\theta - \sin 3\theta}{4}$$

$$\cos 3\theta = 4\cos^3\theta - 3\cos\theta \qquad \cos^3\theta = \frac{3\cos\theta + \cos 3\theta}{4}$$

積和公式

$$\sin\alpha\ \cos\beta = \frac{1}{2}\big(\sin(\alpha+\beta)+\sin(\alpha-\beta)\big) \qquad \cos\alpha\ \sin\beta = \frac{1}{2}\big(\sin(\alpha+\beta)-\sin(\alpha-\beta)\big)$$

$$\cos\alpha\ \cos\beta = \frac{1}{2}\big(\cos(\alpha+\beta)+\cos(\alpha-\beta)\big) \qquad \sin\alpha\ \sin\beta = -\frac{1}{2}\big(\cos(\alpha+\beta)-\cos(\alpha-\beta)\big)$$

和積公式

$$\sin\alpha+\sin\beta = 2\sin\frac{\alpha+\beta}{2}\ \cos\frac{\alpha-\beta}{2} \qquad \sin\alpha-\sin\beta = 2\cos\frac{\alpha+\beta}{2}\ \sin\frac{\alpha-\beta}{2}$$

$$\cos\alpha+\cos\beta = 2\cos\frac{\alpha+\beta}{2}\ \cos\frac{\alpha-\beta}{2} \qquad \cos\alpha-\cos\beta = -2\sin\frac{\alpha+\beta}{2}\ \sin\frac{\alpha-\beta}{2}$$

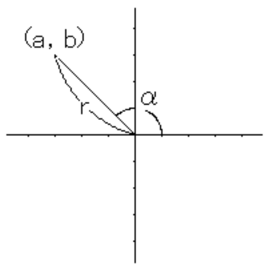
合成

$$a\sin\theta + b\cos\theta = r\sin(\theta+\alpha)$$

$$a\cos\theta + b\sin\theta = r\cos(\theta-\alpha)$$

ただし，　$r = \sqrt{a^2+b^2}$

$$\cos\alpha = \frac{a}{r}\ ,\quad \sin\alpha = \frac{b}{r}$$



逆三角関数

$\theta = \sin^{-1} y \iff \sin\theta = y$　かつ　$-\frac{\pi}{2} \leqq \theta \leqq \frac{\pi}{2}$

$\theta = \cos^{-1} x \iff \cos\theta = x$　かつ　$0 \leqq \theta \leqq \pi$

$\theta = \tan^{-1} m \iff \tan\theta = m$　かつ　$-\frac{\pi}{2} < \theta < \frac{\pi}{2}$