

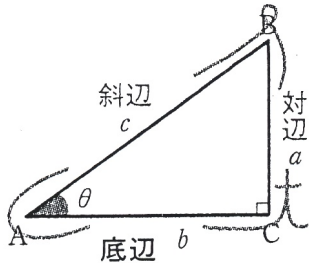


# 三角比の拡張の確認

## ●三角比の定義 (鋭角から鈍角・円への拡張) ●

$$0^\circ < \theta < 90^\circ$$

(直角三角形で定義)



**定義** ( $a, b, c$  で決める)

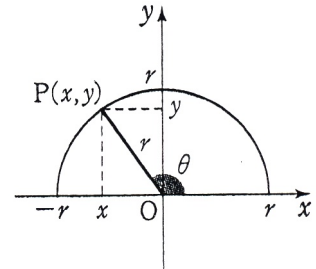
$$\sin \theta = \frac{a}{c} = \frac{\text{対辺}}{\text{斜辺}}$$

$$\cos \theta = \frac{b}{c} = \frac{\text{底辺}}{\text{斜辺}}$$

$$\tan \theta = \frac{a}{b} = \frac{\text{対辺}}{\text{底辺}}$$

$$0^\circ \leq \theta \leq 360^\circ$$

(座標で定義)



**定義** ( $r, x, y$  で決める)

$$\sin \theta = \frac{y}{r} = \frac{y\text{座標}}{\text{半径}}$$

$$\cos \theta = \frac{x}{r} = \frac{x\text{座標}}{\text{半径}}$$

$$\tan \theta = \frac{y}{x} = \frac{y\text{座標}}{x\text{座標}}$$

### 三角比の符号

第2象限

$$90^\circ < \theta < 180^\circ$$

$$\sin \theta > 0$$

$$\cos \theta < 0$$

$$\tan \theta < 0$$

第1象限

$$0^\circ < \theta < 90^\circ$$

$$\sin \theta > 0$$

$$\cos \theta > 0$$

$$\tan \theta > 0$$

第3象限

$$180^\circ < \theta < 270^\circ$$

$$\sin \theta < 0$$

$$\cos \theta < 0$$

$$\tan \theta > 0$$

第4象限

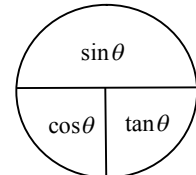
$$270^\circ < \theta < 360^\circ$$

$$\sin \theta < 0$$

$$\cos \theta > 0$$

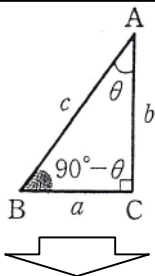
$$\tan \theta < 0$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}, \quad \sin^2 \theta + \cos^2 \theta = 1, \quad 1 + \tan^2 \theta = \frac{1}{\cos^2 \theta}$$



「スイスでちょっとティータイム」  
(sin) (cos) (tan)

### 90° - θ の三角比

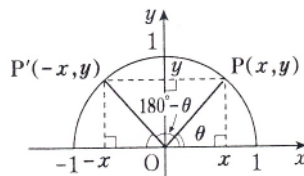


$$\sin(90^\circ - \theta) = \cos \theta$$

$$\cos(90^\circ - \theta) = \sin \theta$$

$$\tan(90^\circ - \theta) = \frac{1}{\tan \theta}$$

### 180° - θ の三角比

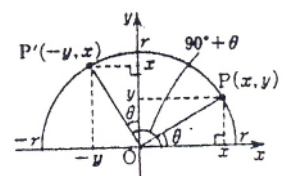


$$\sin(180^\circ - \theta) = \sin \theta$$

$$\cos(180^\circ - \theta) = -\cos \theta$$

$$\tan(180^\circ - \theta) = -\tan \theta$$

### 90° + θ の三角比



$$\sin(90^\circ + \theta) = \cos \theta$$

$$\cos(90^\circ + \theta) = -\sin \theta$$

$$\tan(90^\circ + \theta) = -\frac{1}{\tan \theta}$$