

$$\frac{1}{\sin 68^\circ \sin 112^\circ} + \frac{\tan 158^\circ}{\tan 68^\circ} = \boxed{?}$$

公式

$$\left( \begin{array}{l} \sin(180^\circ - \theta) = \sin \theta \\ \cos(180^\circ - \theta) = -\cos \theta \\ \tan(180^\circ - \theta) = -\tan \theta \end{array} \right)$$

$$\left( \begin{array}{l} \sin(90^\circ + \theta) = \cos \theta \\ \cos(90^\circ + \theta) = -\sin \theta \\ \tan(90^\circ + \theta) = -\frac{1}{\tan \theta} \end{array} \right)$$

$$\sin(180^\circ - \theta) = \sin \theta \quad \because \theta = 68^\circ \text{ を代入して}$$

$$\sin(180^\circ - 68^\circ) = \sin 68^\circ$$

$$\therefore \sin 112^\circ = \sin 68^\circ$$

$$\tan(90^\circ + \theta) = -\frac{1}{\tan \theta} \quad \because \theta = 68^\circ \text{ を代入して}$$

$$\tan(90^\circ + 68^\circ) = -\frac{1}{\tan 68^\circ}$$

$$\therefore \tan 158^\circ = -\frac{1}{\tan 68^\circ}$$

$$(与式) = \frac{1}{\sin 68^\circ \times \sin 68^\circ} + \frac{-\frac{1}{\tan 68^\circ}}{\tan 68^\circ}$$

$$= \frac{1}{\sin^2 68^\circ} - \frac{1}{\tan^2 68^\circ}$$

$$= \frac{1}{\sin^2 68^\circ} - \frac{\cos^2 68^\circ}{\sin^2 68^\circ}$$

$$= \frac{1 - \cos^2 68^\circ}{\sin^2 68^\circ}$$

$$= \frac{\sin^2 68^\circ}{\sin^2 68^\circ}$$

$$= \underline{\underline{1}}$$

$$\Rightarrow \tan \theta = \frac{\sin \theta}{\cos \theta} \text{ を使う}$$

↓ 逆数にして

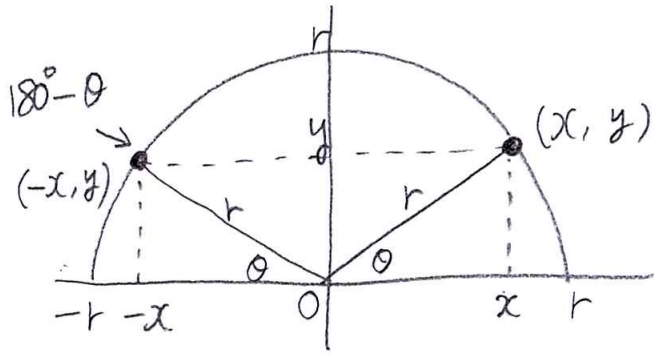
$$\frac{1}{\tan \theta} = \frac{\cos \theta}{\sin \theta}$$

$$\Rightarrow \sin^2 \theta + \cos^2 \theta = 1 \text{ を使う}$$

↓

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

$180^\circ - \theta$  が  $\theta$  に変え子わけ



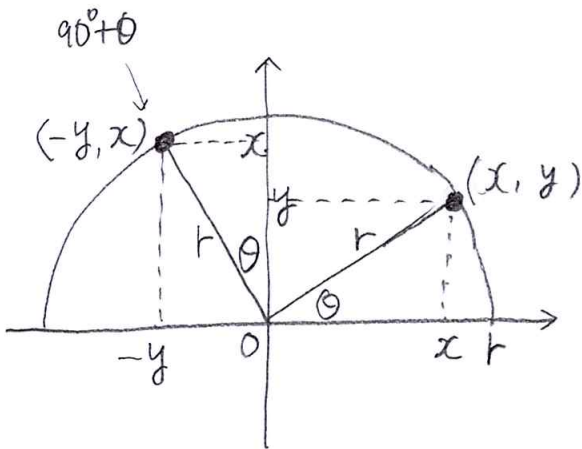
$$\sin \theta = \frac{y}{r} \quad \cos \theta = \frac{x}{r} \quad \tan \theta = \frac{y}{x}$$

$$\sin(180^\circ - \theta) = \left(\frac{y}{r}\right) = \sin \theta$$

$$\cos(180^\circ - \theta) = \frac{-x}{r} = -\left(\frac{x}{r}\right) = -\cos \theta$$

$$\tan(180^\circ - \theta) = \frac{y}{-x} = -\left(\frac{y}{x}\right) = -\tan \theta$$

$90^\circ + \theta$  を  $\theta$  に変え子わけ



$$\sin \theta = \frac{y}{r} \quad \cos \theta = \frac{x}{r} \quad \tan \theta = \frac{y}{x}$$

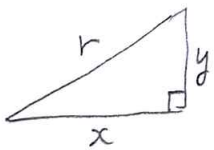
$$\sin(90^\circ + \theta) = \left(\frac{x}{r}\right) = \cos \theta$$

$$\cos(90^\circ + \theta) = \frac{-y}{r} = -\left(\frac{y}{r}\right) = -\sin \theta$$

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

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

≡ 平角の定理



$$\left(\frac{y}{r}\right)^2 + \left(\frac{x}{r}\right)^2 = \frac{y^2}{r^2} + \frac{x^2}{r^2} = \frac{x^2 + y^2}{r^2} = \frac{r^2}{r^2} = 1$$

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

$$\frac{\sin \theta}{\cos \theta} = \frac{\frac{y}{r}}{\frac{x}{r}} = \frac{\frac{y}{r} \times r}{\frac{x}{r} \times r} = \frac{y}{x} = \tan \theta$$