

Supplemental WS # 7

$$\begin{aligned} ① \quad & \cos 53^\circ \cdot \cos 27^\circ - \sin 53^\circ \cdot \sin 27^\circ \\ &= \cos (53^\circ + 27^\circ) \\ &= \cos 80^\circ \end{aligned}$$

$$\begin{aligned} ② \quad & \frac{\tan \frac{\pi}{2} + \tan \frac{\pi}{3}}{1 - \tan \frac{\pi}{2} \cdot \tan \frac{\pi}{3}} = \tan \left(\frac{\pi}{2} + \frac{\pi}{3} \right) \\ &= \tan \frac{5\pi}{6} \end{aligned}$$

$$\begin{aligned} ③ \quad & \sin 69^\circ \cdot \cos 21^\circ - \sin 21^\circ \cdot \cos 69^\circ \\ &= \sin (69^\circ - 21^\circ) \\ &= \sin 48^\circ \end{aligned}$$

$$\begin{aligned} ④ \quad & \cos 7x - \cos 4x + \sin 4x \cdot \sin 7x \\ &= \cos (7x - 4x) \\ &= \cos 3x \end{aligned}$$

$$\begin{aligned} ⑤ \quad & \cos \frac{\pi}{7} \cdot \sin \frac{\pi}{4} + \sin \frac{\pi}{7} \cdot \cos \frac{\pi}{4} \\ &= \sin \left(\frac{\pi}{7} + \frac{\pi}{4} \right) \\ &= \sin \frac{11\pi}{28} \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \quad \text{LHS} &= \sin\left(\frac{\pi}{2} - \theta\right) \\
 &= \sin \frac{\pi}{2} \cos \theta - \cos \frac{\pi}{2} \sin \theta \\
 &= (1) \cos \theta - (0) \sin \theta \\
 &= \cos \theta \\
 &= \text{RHS}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{7} \quad \text{LHS} &= \cos(-\theta) \\
 &= \cos(0 - \theta) \\
 &= \cos 0 \cdot \cos \theta + \sin 0 \cdot \sin \theta \\
 &= (1) \cos \theta + (0) \sin \theta \\
 &= \cos \theta \\
 &= \text{RHS}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{8} \quad \text{LHS} &= \cos 6x + \cos 5x + \sin 6x \cdot \sin 5x \\
 &= \cos(6x - 5x) \\
 &= \cos x \\
 &= \text{RHS}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{9} \quad \text{LHS} &= \cos\left(\frac{3\pi}{2} - \theta\right) \\
 &= \cos \frac{3\pi}{2} \cdot \cos \theta + \sin \frac{3\pi}{2} \cdot \sin \theta \\
 &= (0) \cos \theta + (-1) \sin \theta \\
 &= -\sin \theta \\
 &= \text{RHS}
 \end{aligned}$$

(10)

$$\sin\left(\frac{\pi}{2} - \theta\right) = \frac{1}{2}$$

$$\sin \frac{\pi}{2} \cdot \cos \theta - \cos \frac{\pi}{2} \sin \theta = \frac{1}{2}$$

$$(1) \cos \theta - (0) \sin \theta = \frac{1}{2}$$

$$\cos \theta = \frac{1}{2}$$

$$\theta = \frac{3\pi}{4}$$

(11)

$$\tan(\pi - \theta) = \tan \frac{3\pi}{4}$$

$$\frac{\tan \pi - \tan \theta}{1 + \tan \pi \cdot \tan \theta} = \tan \frac{3\pi}{4}$$

$$\frac{0 - \tan \theta}{1 + (0) \tan \theta} = \tan \frac{3\pi}{4}$$

$$- \tan \theta = \tan \frac{3\pi}{4}$$

$$- \tan \theta = -1$$

$$\tan \theta = 1$$

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

(12)

$$\cos\left(\frac{\pi}{4} + \frac{\pi}{3}\right) = -\sin\phi$$

$$\cos\frac{\pi}{4} \cdot \cos\frac{\pi}{3} - \sin\frac{\pi}{4} \cdot \sin\frac{\pi}{3} = -\sin\phi$$

$$(0)\left(\frac{1}{2}\right) - (1)\left(\frac{\sqrt{3}}{2}\right) = -\sin\phi$$

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

$$\sin\phi = \frac{\sqrt{3}}{2}$$

$$\phi = \frac{\pi}{3}$$

(13)

$$\sin\left(\frac{\pi}{4} + \phi\right) = \sin\frac{\pi}{5}$$

$$\sin\frac{\pi}{4} \cos\phi + \cos\frac{\pi}{4} \sin\phi = \sin\frac{\pi}{5}$$

$$(1)\cos\phi + (0)\sin\phi = \frac{\sqrt{2}}{2}$$

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

$$\phi = \frac{\pi}{4}$$