

15) วิธีทำ จากโจทย์กำหนด $\sin 15^\circ + \sin 55^\circ = x$ และ $\cos 15^\circ + \cos 55^\circ = y$

$$\begin{aligned}(x + y)^2 - 2xy &= x^2 + 2xy + y^2 - 2xy \\ &= x^2 + y^2\end{aligned}$$

$$\text{หาค่า } x^2 = (\sin 15^\circ + \sin 55^\circ)^2 = \sin^2 15^\circ + 2\sin 15^\circ \sin 55^\circ + \sin^2 55^\circ$$

$$\text{หาค่า } y^2 = (\cos 15^\circ + \cos 55^\circ)^2 = \cos^2 15^\circ + 2\cos 15^\circ \cos 55^\circ + \cos^2 55^\circ$$

$$\begin{aligned}x^2 + y^2 &= (\sin^2 15^\circ + 2\sin 15^\circ \sin 55^\circ + \sin^2 55^\circ) + (\cos^2 15^\circ + 2\cos 15^\circ \cos 55^\circ + \cos^2 55^\circ) \\ &= (\sin^2 15^\circ + \cos^2 15^\circ) + (\sin^2 55^\circ + \cos^2 55^\circ) + (2\cos 15^\circ \cos 55^\circ + 2\sin 15^\circ \sin 55^\circ) \\ &= \boxed{\sin^2 15^\circ + \cos^2 15^\circ} + \boxed{\sin^2 55^\circ + \cos^2 55^\circ} + 2\boxed{\cos 15^\circ \cos 55^\circ + \sin 15^\circ \sin 55^\circ} \\ &\quad \uparrow \quad \quad \quad \uparrow \quad \quad \quad \uparrow \\ &\quad 1 \quad \quad \quad 1 \quad \quad \quad \cos(15^\circ - 55^\circ) = \cos(-40^\circ)\end{aligned}$$

$$\begin{aligned}x^2 + y^2 &= 1 + 1 + 2[\cos(-40^\circ)] \\ &= 2 + 2[\cos(-40^\circ)]\end{aligned}$$

$$\text{จาก } \cos(-\theta) = \cos\theta$$

$$\begin{aligned}x^2 + y^2 &= 2 + 2\cos 40^\circ \\ &= 2 + 2\cos 2(20^\circ)\end{aligned}$$

$$\text{จาก } \cos(2\theta) = 2\cos^2\theta - 1$$

$$x^2 + y^2 = 2 + 2(2\cos^2 20^\circ - 1)$$

$$x^2 + y^2 = 2 + 4\cos^2 20^\circ - 2$$

$$\therefore x^2 + y^2 = 4\cos^2 20^\circ$$

สรุปสูตรคำนวณที่ใช้ในข้อนี้

$$\cos(-\theta) = \cos\theta$$

$$\cos(2\theta) = 2\cos^2\theta - 1$$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

ตอบ E