

$$(2) -2 \sin \alpha \sin \beta = \cos(\alpha + \beta) - \cos(\alpha - \beta)$$

$$(3) \quad 2 \cos \alpha \cos \beta = \cos(\alpha + \beta) + \cos(\alpha - \beta)$$

Sol. 原式 =  $-\frac{1}{2}(\cos 60^\circ - \cos 40^\circ) \sin 70^\circ (-+)$   
 $= -\frac{1}{2}(\frac{1}{2} \sin 70^\circ - \cos 40^\circ \sin 70^\circ)$

$$= -\frac{1}{2} \left( \frac{1}{2} \sin 70^\circ - \underline{\cos 40^\circ \sin 70^\circ} \right)$$
$$= -\frac{1}{2} \left[ \frac{1}{2} \sin 70^\circ - \frac{1}{2} (\sin 110^\circ + \underline{\sin 30^\circ}) \right]$$
$$= -\frac{1}{2} \left[ \cancel{\frac{1}{2} \sin 70^\circ} - \cancel{\frac{1}{2} \sin 110^\circ} - \frac{1}{4} \right] = \frac{1}{8}$$

Sol. 原 =  $\frac{1}{2} (\cos 60^\circ + \cos 40^\circ) \cos 70^\circ$

$$\begin{aligned}
 &= \frac{1}{2} \left( \frac{1}{2} \cos 70^\circ + \underline{\cos 40^\circ \cos 70^\circ} \right) \\
 &= \frac{1}{2} \left[ \frac{1}{2} \cos 70^\circ + \frac{1}{2} (\cos 110^\circ + \underline{\cos 30^\circ}) \right] \\
 &= \frac{1}{2} \left[ \cancel{\frac{1}{2} \cos 70^\circ + \frac{1}{2} \cos 110^\circ} + \frac{\sqrt{3}}{4} \right] \\
 &= \frac{\sqrt{3}}{8}
 \end{aligned}$$