

$$3. \text{SEC } 75^\circ$$

$$= \text{SEC } (120^\circ - 45^\circ)$$

$$= \frac{1}{\cos(120^\circ - 45^\circ)}$$

Formula

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

$$= \frac{1}{\cos 120^\circ \cos 45^\circ + \sin 120^\circ \sin 45^\circ}$$

$$= \frac{1}{-\frac{1}{2} \left(\frac{\sqrt{2}}{2}\right) + \frac{\sqrt{3}}{2} \left(\frac{\sqrt{2}}{2}\right)}$$

$$= \frac{1}{\frac{-\sqrt{2}}{4} + \frac{\sqrt{6}}{4}}$$

$$= \frac{4(1)}{4\left(\frac{-\sqrt{2}}{4}\right) + 4\left(\frac{\sqrt{6}}{4}\right)}$$

$$= \frac{4}{-\sqrt{2} + \sqrt{6}}$$

$$= \frac{4}{-\sqrt{2} + \sqrt{6}} \cdot \frac{-\sqrt{2} - \sqrt{6}}{-\sqrt{2} - \sqrt{6}}$$

$$= \frac{4(-\sqrt{2} - \sqrt{6})}{2 - 6}$$

$$= \frac{-4(\sqrt{2} + \sqrt{6})}{-4}$$

$$= \boxed{\sqrt{2} + \sqrt{6}}$$

$$4. \cos 85^\circ \cos 25^\circ + \sin 85^\circ \sin 25^\circ$$

$$\downarrow \cos(\alpha - \beta)$$

$$= \cos(85^\circ - 25^\circ)$$

$$= \cos(60^\circ)$$

$$= \boxed{\frac{1}{2}}$$