

$$\begin{aligned}
 (2) \quad & \sin 74^\circ \cos 46^\circ + \cos 74^\circ \sin 46^\circ \\
 &= \sin(74^\circ + 46^\circ) \\
 &= \sin 120^\circ \\
 &= \frac{\sqrt{3}}{2}
 \end{aligned}$$

$$\begin{aligned}
 (3) \quad & \cos 105^\circ \\
 &= \cos(45^\circ + 60^\circ) \\
 &= \cos 45^\circ \cos 60^\circ - \sin 45^\circ \sin 60^\circ \\
 &= \frac{\sqrt{2}}{2} \times \frac{1}{2} - \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{2} \\
 &= \frac{\sqrt{2} - \sqrt{6}}{4}
 \end{aligned}$$

$$\alpha = \frac{3}{5} \Rightarrow \sin \alpha = -\frac{4}{5}$$

Diagram: A right triangle with hypotenuse 5, vertical side 4, and horizontal side 3. The angle  $\alpha$  is at the bottom-left vertex.

$$\beta = -\frac{15}{17} \Rightarrow \cos \beta = -\frac{8}{17}$$

Diagram: A right triangle with hypotenuse 17, horizontal side 8, and vertical side 15. The angle  $\beta$  is at the bottom-left vertex.

$$\begin{aligned}
 \sin(\alpha - \beta) &= \sin \alpha \cos \beta - \cos \alpha \sin \beta \\
 &= \left(-\frac{4}{5}\right) \times \left(-\frac{8}{17}\right) - \frac{3}{5} \times \left(-\frac{15}{17}\right) \\
 &= \frac{77}{85}
 \end{aligned}$$

$$\begin{aligned}
 \cos(\alpha - \beta) &= \cos \alpha \cos \beta + \sin \alpha \sin \beta \\
 &= \frac{3}{5} \times \left(-\frac{8}{17}\right) + \left(-\frac{4}{5}\right) \times \left(-\frac{15}{17}\right) \\
 &= \frac{36}{85}
 \end{aligned}$$

$$\begin{aligned}
 (2) \quad & \sqrt{\frac{9}{24}} \sqrt{\frac{32}{23}} \\
 &= \sqrt{\frac{9 \times 32}{24 \times 23}} \\
 &= \sqrt{\frac{3 \times 2^5}{2^3 \times 3 \times 23}} \\
 &= \sqrt{\frac{2^2 \times 2}{23}} \\
 &= \frac{2\sqrt{2}}{\sqrt{23}}
 \end{aligned}$$

Diagram: A right triangle with hypotenuse 23, vertical side 2, and horizontal side  $\sqrt{2}$ . The angle is at the bottom-left vertex.

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## 自我省思

本次公開觀課的單元是和差角公式，授課以傳統的講述方式為主，首先拋出 $\sin 75^\circ$ 無法透過常用的 $30^\circ-60^\circ-90^\circ$ 或 $45^\circ-45^\circ-90^\circ$ 直接寫出值，進而證明推導 $\sin(a+b)=\sin(a)\times\cos(b)$

$+\cos(a)\times\sin(b)$ 。

證明內容是使用高一下的三角形面積作法，順便透過證明過程去複習並加強觀念，學生反應不錯，後來也有說明另一種證明方式，主要是從座標的角度切入。

最後課堂的結尾，有帶著學生操作 $\sin 75^\circ$ 的拆解，成功的完成課堂學習任務。