Problem 1

Fill in the blank: $\cos(A)\cos(B) - \sin(A)\sin(B) =$

$$\cos(A + B)$$

Problem 2

Fill in the blank: $\tan(A + B) =$

$$\frac{\tan(A) + \tan(B)}{1 - \tan(A)\tan(B)}$$

Problem 3

Find the exact value of $\sin(60° + 45°)$

$$\begin{aligned}\sin(60° + 45°) &= \sin(60°)\cos(45°) + \cos(60°)\sin(45°) \\ &= (\frac{\sqrt{3}}{2})(\frac{\sqrt{2}}{2}) + (\frac{1}{2})(\frac{\sqrt{2}}{2}) \\ &= \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} \\ &= \frac{\sqrt{6} + \sqrt{2}}{4}\end{aligned}$$

Problem 4

Find the exact value: $\cos(57°)\cos(33°) - \sin(57°)\sin(33°)$

$$\cos(57°)\cos(33°) - \sin(57°)\sin(33°)$$

$$= \cos(57° + 33°)$$

$$= \cos(90°)$$

$$= 0$$

Problem 5

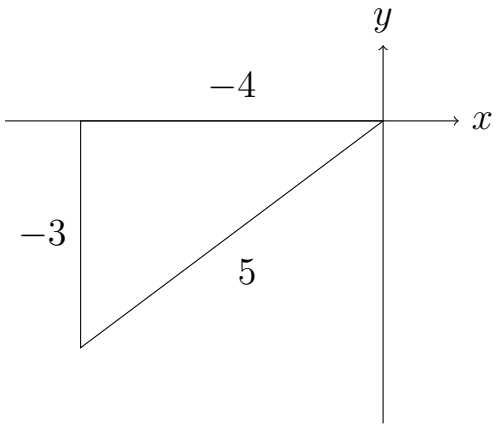
Find $\tan(75°)$

$$\begin{aligned}
\tan(75°) &= \tan(45° + 30°) \\
&= \frac{\tan(45°) + \tan(30°)}{1 - \tan(45°)\tan(30°)} \\
&= \frac{\frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} + \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}}{1 - \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} \cdot \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}} \\
&= \frac{1 + \frac{1}{2} \cdot \frac{2}{\sqrt{3}}}{1 - 1 \cdot \frac{1}{2} \cdot \frac{2}{\sqrt{3}}} \\
&= \left(\frac{1 + \frac{\sqrt{3}}{3}}{1 - \frac{\sqrt{3}}{3}}\right) 3 \\
&= (\frac{3 + \sqrt{3}}{3 - \sqrt{3}}) \cdot (\frac{3 + \sqrt{3}}{3 + \sqrt{3}}) \\
&= \frac{9 + 3\sqrt{3} + 3\sqrt{3} + 3}{9 - 3\sqrt{3} + 3\sqrt{3} - 3} \\
&= \frac{12 + 6\sqrt{3}}{6} \\
&= 2 + \sqrt{3}
\end{aligned}$$

Problem 6

Given $\tan(u) = \frac{3}{4}$ in Q3 and $\sin(v) = \frac{5}{13}$ in Q2. Find $\cos(u - v)$

Graph of u:



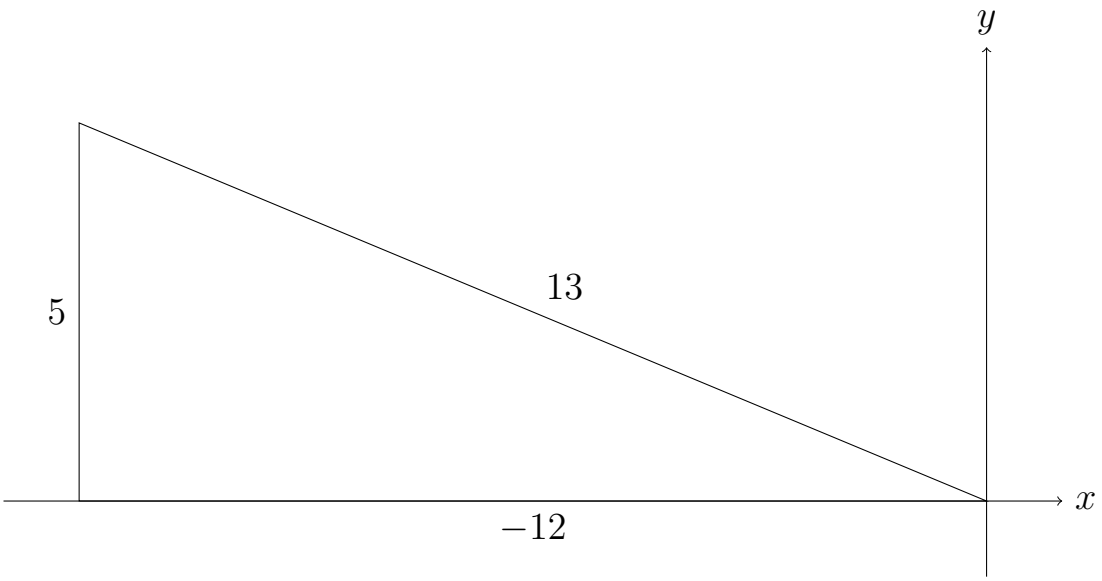
$$(-4)^2 + (-3)^2 = r^2$$

$$16 + 9 = r^2$$

$$25 = r^2$$

$$5 = r$$

Graph of v:



$$x^2 + (5)^2 = (13)^2$$

$$x^2 + 25 = 169$$

$$x^2 = 144$$

$$x = -12$$

Combining the information:

$$\cos(u - v) = \cos(u)\cos(v) + \sin(u)\sin(v)$$

$$(\frac{-4}{5})(\frac{-12}{13}) + (\frac{-3}{5})(\frac{5}{13})$$

$$\frac{48}{65} + \frac{-15}{65}$$

$$\frac{33}{65}$$

Secret Phrase

What was the secret phrase you found?

GO TECH