Handout for MATH 1300 (Barsamian) Lect. L39 Fri Nov 13, 2026 Sections 5.2, 5.3

Recall the Angle Sum Formulas

$\sin(a+b) = \sin a \cos b + \cos a \sin b$

$\cos(a+b) = \cos a \cos b - \sin a \sin b$

$\tan(a+b) = \dfrac{\tan a + \tan b}{1 - \tan a \tan b}$

[1] Use the sum formulas to find the exact value of $\cos\frac{6\pi}{5}\cos\frac{13\pi}{15} + \sin\frac{6\pi}{5}\sin\frac{13\pi}{15}$

[2] Suppose that $\cos a = \frac{15}{17}$ and a is in quad IV and that $\tan b = \frac{3}{4}$ with b in quad I. Find $\sin(a+b)$

[3] Rewrite $\sin(\cos^{-1} u - \sin^{-1} v)$ as an algebraic expression in u, v. Assume that u, v are positive real numbers.

[4] Prove the identity $\frac{\sin(x+y)}{\cos x \cos y} = \tan x + \tan y$.

[5] Prove the identity $\sin\left(\frac{\pi}{4} + x\right) + \sin\left(\frac{\pi}{4} - x\right) = \sqrt{2}\cos x$.

[6] Derive the Double-Angle Identities

$\sin(2a) =$?

$\cos(2a) =$?

$\tan(2a) =$?

[7] Find $\sin 2x$, $\cos 2x$, and $\tan 2x$ if $\cos x = -\frac{3}{\sqrt{13}}$ and x terminates in quad II.