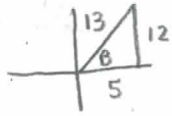
Honors Algebra II/Trig
Unit 8B Review

Name: Key

Given that $\cos A = \frac{4}{5}$, A terminates in Quadrant IV, $\sin B = \frac{12}{13}$, and B terminates in Quadrant I find:



1. $\cos 2A$

$2\cos^2 A - 1$

$2\left(\frac{4}{5}\right)^2 - 1$

$\frac{32}{25} - 1 = \boxed{\frac{7}{25}}$

2. $\tan 2B$

$\frac{2\tan B}{1-\tan^2 B} = \frac{2\left(\frac{12}{5}\right)}{1-\left(\frac{12}{5}\right)^2} = \frac{\frac{24}{5}}{1-\frac{144}{25}}$

$\frac{\frac{24}{5}}{\frac{-119}{25}} = \frac{24}{5} \cdot \frac{5}{-119} = \boxed{\frac{-120}{119}}$

3. $\sin(A+B)$

$\sin A\cos B + \cos A\sin B$

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

$\frac{-15+48}{65} = \boxed{\frac{33}{65}}$

4. $\cos(A-B)$

$\cos A\cos B + \sin A\sin B$

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

$\frac{20-36}{65} = \boxed{\frac{-16}{65}}$

For problems #5-8, prove the identity.

5. $\sin 2x = 2\cot x \sin^2 x$

$= 2\frac{\cos x}{\sin x} \cdot \sin^2 x$

$= 2\cos x \sin x$

$\sin 2x = \sin 2x$

6. $\sin(x+30^\circ) - \cos(x+60^\circ) = \sqrt{3}\sin x$

$\sin x\cos 30 + \cos x \sin 30 - (\cos x \cos 60 - \sin x \sin 60) =$

$\frac{\sqrt{3}}{2}\sin x + \frac{1}{2}\cos x - \frac{1}{2}\cos x + \frac{\sqrt{3}}{2}\sin x =$

$\sqrt{3}\sin x = \sqrt{3}\sin x$

7. $\frac{\sec^2 x - \tan^2 x + \tan x}{\sec x} = \cos x + \sin x$

$\frac{1+\tan x}{\sec x} =$

$\frac{1}{\sec x} + \frac{\sin x}{\cos x} \cdot \frac{\cos x}{1} =$

$\cos x + \sin x = \cos x + \sin x$

8. $\frac{(\sin x + \cos x)}{\cos x} - \frac{(\cos x - \sin x)}{\sin x} = \sec x \csc x$ (cos x, sin x)

$\frac{\cos x\sin x + \cos^2 x - \cos x \sin x + \sin^2 x}{\cos x \sin x}$

$\frac{1}{\cos x \sin x} =$

$\sec x \csc x = \sec x \csc x$

9. Find the exact value of $\cos 75°$

$\cos(30°+45°)=$

$\cos 30°\cos 45° - \sin 30°\sin 45°$

$\frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2} - \frac{1}{2}\cdot\frac{\sqrt{2}}{2}$

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

10. Find the exact value of $\sin 15°$.

$\sin(45°-30°)=$

$\sin 45\cos 30 - \cos 45 \sin 30$

$\frac{\sqrt{2}}{2}\cdot\frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2}\cdot\frac{1}{2}$

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

For problems #11-13, solve the equation in the indicated domain.

11. $\sin 2x\cos x + \cos 2x \sin x = 1$ $\quad x \in [0,2\pi)$

$\sin(3x) = 1$

$3x = \frac{\pi}{2} + 2\pi n$

$x = \frac{\pi}{6} + \frac{2\pi}{3}n$

$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}$

12. $2\sin x \cos x = \sqrt{2}\cos x$ $\quad x \in [0,2\pi)$

$2\sin x\cos x - \sqrt{2}\cos x = 0$

$\cos x(2\sin x - \sqrt{2}) = 0$

$\cos x = 0 \quad \sin x = \frac{\sqrt{2}}{2}$

$x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{4}, \frac{3\pi}{4}$

13. $2\sin^2 x - \sin x = 0$ $\quad x \in [0,360°)$

$\sin x(2\sin x - 1) = 0$

$\sin x = 0 \quad \sin x = \frac{1}{2}$

$x = 0°, 180°, 30°, 150°$